AVIATION WEEK

OCT. 1, 1951

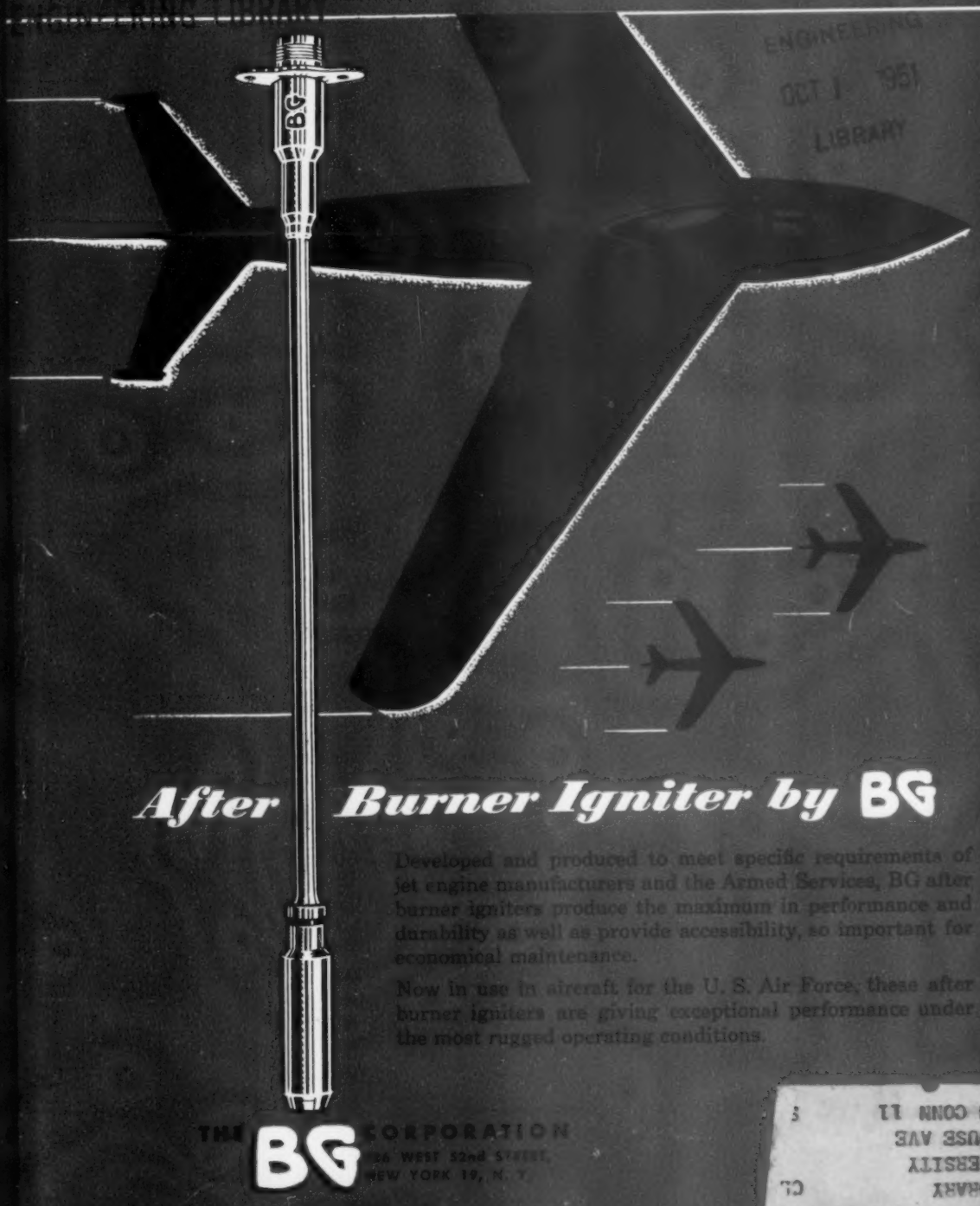
50 CENTS

A McGRAW-HILL PUBLICATION

ENGINEERING LIBRARY

OCT 1 1951

LIBRARY



After Burner Igniter by BG

Developed and produced to meet specific requirements of jet engine manufacturers and the Armed Services, BG after burner igniters produce the maximum in performance and durability as well as provide accessibility, so important for economical maintenance.

Now in use in aircraft for the U. S. Air Force, these after burner igniters are giving exceptional performance under the most rugged operating conditions.

THE BG CORPORATION
26 WEST 52nd STREET,
NEW YORK 19, N. Y.

ENGG. LIBRARY
YALE UNIVERSITY
10 HILLHOUSE AVE
NEW HAVEN CONN 11

AIRCRAFT: First Jet Carrier Photographic Plane, Navy

F2H-2P Banshee, Produced by McDonnell

ENGINE: Westinghouse J-34 Jet

METERING SYSTEM: Holley Turbine Control

FOR MORE THAN HALF A CENTURY—ORIGINAL EQUIPMENT
MANUFACTURERS FOR THE AUTOMOTIVE AND AIRCRAFT INDUSTRIES

HOLLEY
Carburetor Co.
DETROIT 4

A-12

Official Air Force Very Light Flying Suit, Nylon. Type K-2A

How to cool off a "hot" pilot

(or keep him hot)

Official Air Force Very Heavy Flying Suit consisting of Jacket N-2A and Trousers D-1A

Whether ferrying bombers through below-zero weather, or flying jet fighters in tropical climates, USAF airmen have the finest flying gear available—specifically designed to stand up under extreme temperature and altitude.

That's why many standard USAF flying suits, like those above, are zippered by flawless precision-engineered Conmar zippers. Conmar zippers slide smoothly, easily, instantly . . . yet a flick of the finger lock them securely in place. They're rust-proof, mildew-resistant, water-repellent — sturdy enough to take heavy cross-pull strain.

There's a flawless Conmar zipper for *every* closure situation. When ordering zippers under QM-100-31, AN-229 or VF 106, call any of the Conmar offices listed below. They're ready to help you.

Conmar zippers

Conmar, Newark 1, N. J. Direct N. Y. Phone: REctor 2-9800. BRANCHES: Atlanta · Baltimore · Boston · Chicago Cincinnati · Cleveland · Dallas · Los Angeles · Minneapolis · Philadelphia · Rochester · St. Louis · San Francisco

Titeflex

ALL-METAL FLEXIBLE TUBING

Because it is made *entirely from metal,* Titeflex possesses the strength of metal to resist heat, cold, pressure, vacuum, chafing and corrosion. Yet it has the added quality of flexibility to facilitate installation and counteract vibration.

Titeflex tubing is manufactured from brass, bronze, stainless, Monel and Inconel for a variety of aircraft applications. Some of these are: Ignition Shielding; Exhaust Connections; Gas, Oil and Air Lines; Instrument Connectors; Deicer Ducts. Many of these are furnished complete as standard products — or our staff will work with you to develop new designs.

WRITE TODAY FOR SPECIAL AIRCRAFT BULLETIN

Titeflex, Inc.

517 Frelinghuysen Ave. Newark 5, N. J.

SPECIALISTS IN AIRCRAFT, AUTOMOTIVE AND MARINE IGNITION SHIELDING

Aviation Week

ABP Member ABC

Volume 55 **October 1, 1951** **Number 14**

Headline News

Shake-up Due in Material Controls.. 13
Missiles' Future Stirs Congress..... 14
Aluminum Supply Depends on Rain.. 15
AF Defends Shepard Resignation.... 16
No Settlement Seen in Douglas Strike. 16
Air Show Tragedy Causes CAA Ban. 17
Military Decides on Heptane Test.... 17
CAB Asks Revision of West Coast Fare. 17
AF Organization Now Set..... 17

Financial

NAL Readies for Proxy Battle..... 19

Aeronautical Engineering

Designing a High-Speed Flying Boat.. 20

Equipment

TWA Bustling with 4-0-4 Plans..... 33
NWA Adopts Analyzer..... 35

Air Transport

CAB Looks Anew at Nonskeds..... 43
CAB Orders Nonsked Out of Business. 44
Retirement of DC-3 Postponed..... 44
BOAC Pushes N. Y.-Bermuda Comet. 45
PAA to Go Own Way on Coach..... 45
Subsidy Bill Seen Favoring Skeds... 46
CAB Will Slash Mail Pay..... 48

Editorials

Taming the Giant's Roar..... 58
A New Look at Nonskeds..... 58
Shoptalk 58

Departments

News Digest 7
Aviation Calendar 8
Picture Page 9
Who's Where 11
Industry Observer 11
Washington Roundup 12
NACA Reports 29
USAF Contracts 37
New Aviation Products..... 40
Shortlines 49
Cockpit Viewpoint 56
What's New 56

36,876 copies of this issue printed

Robert H. Wood
EDITOR

Merlin H. Mickel.....MANAGING EDITOR

William Kroger.....Assistant Managing Editor
Alexander McSurely..Assistant Managing Editor
Irving Stone.....Technical Editor
Ben Lee.....Military Editor
G. L. Christian, III....Equipment & Maintenance
David A. Anderton.....Engineering
F. Lee Moore.....Transport
Katherine Johnsen.....Congress
Henry Lefer.....News Desk
Scott H. Reiniger.....Editorial Assistant
Victoria Giaculli.....Editorial Assistant
Erwin J. Bulban.....Special Assignments
Thomas M. Self.....Los Angeles
Leo T. Tarpey.....Editorial Makeup

Editorial Offices: 330 West 42nd St., New York 18. N. Y., Phone Longacre 4-3035 National Press Bldg., Washington 4, D. C., Phone National 3414.

Domestic News Bureaus: Atlanta 3, Rhodes-Haverty Bldg.; Chicago 11, 520 N. Michigan Ave.; Cleveland 15, Hanna Bldg.; Detroit 26, Penobscot Bldg.; Los Angeles 17, 1111 Wilshire Blvd.; San Francisco 4, 68 Post St.; Houston, 514 South St. *Correspondents* in more than 60 major cities.

Foreign News Bureaus: London, Paris, Frankfurt, Tokyo, Bombay, Melbourne, Rio de Janeiro, Mexico City. *Correspondents* in more than 50 major cities.

Robert F. Boger
PUBLISHER

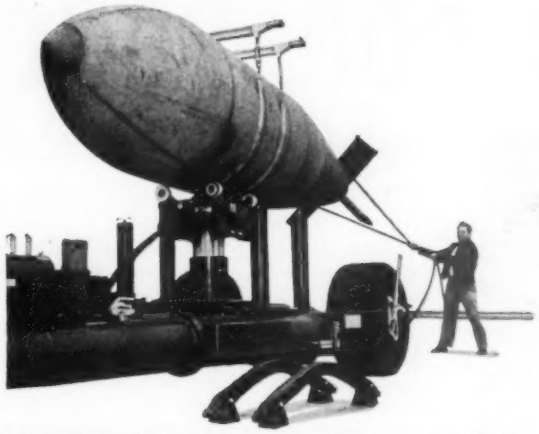
R. W. Martin, Jr., *Sales Manager;* J. G. Johnson, *Business Manager;* Anita Scaffo, *Research and Marketing;* Sales Representatives: J. C. Anthony, New York; M. J. Storz, Philadelphia; H. P. Johnson, Cleveland; L. J. Biel, Chicago; W. F. Donnell, St. Louis; James Cash, Dallas; R. C. Maultsby, Atlanta; J. W. Otterson, San Francisco; C. F. McReynolds, Los Angeles. Other sales offices in Pittsburgh, Detroit, Boston, London.

October 1, 1951 AVIATION WEEK Vol. 55—No. 14
Member ABC and ABP

Published weekly by McGraw-Hill Publishing Company, Inc., James H. McGraw (1860-1948), Founder. **Publication Office: 99-129 North Broadway, Albany 1, N. Y.**
Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 18, N. Y. Curtis W. McGraw, President; Willard Chevalier, Executive Vice-President; Joseph A. Gerardi, Vice-President and Treasurer; John J. Cooke, Secretary; Paul Montgomery, Senior Vice-President, Publications Division; Ralph B. Smith, Editorial Director; Nelson Bond, Vice-President and Director of Advertising; J. E. Blackburn, Jr., Vice-President and Director of Circulation.
Subscriptions: Address correspondence to AVIATION WEEK—Subscription Service, 99-129 N. Broadway, Albany 1, N. Y., or 330 W. 42nd St., New York 18, N. Y. Allow ten days for change of address.
Please indicate position and company connection on all subscription orders.
Single copies 50¢. Subscription rates—United States and possessions, $6 a year; $9 for two years; $12 for three years. Canada, $8 a year; $12 for two years; $16 for three years, payable in Canadian currency at par. Pan American countries, $10 a year; $16 for two years; $20 for three years. All other countries, $30 a year; $30 for two years; $40 for three years. Entered as second-class matter, July 16, 1947, at the Post Office at Albany, N. Y., under Act of Mar. 3, 1879. Printed in U. S. A. Copyright 1951 by McGraw-Hill Publishing Co. Inc.—All Rights Reserved. Cable address "McGraw-Hill New York." Publications combined with AVIATION WEEK are AVIATION, AVIATION NEWS, AIR TRANSPORT, AERONAUTICAL ENGINEERING and AIRCRAFT JOURNAL. All rights to these names are reserved by McGraw-Hill Publishing Co.

Flying an early Wright pusher plane, Lt. M. S. Crissy and Phillip O. Parmalee took off at San Francisco with the first explosive ever to be dropped from a U. S. airplane.

U. S. Army First Bomb Drop . . . January 1911



Hydraulic bomb lift, designed for the Air Force and built by Boeing, rests on a wheeled carriage which can be used to transport the bomb to the ramp and load it into the bay of the bomber. One man, operating the lift, can raise a 25-ton bomb 12½ feet, roll it 360° in either direction, shift it 4" either side of center and 10" fore or aft, and tilt it 6° up or down.

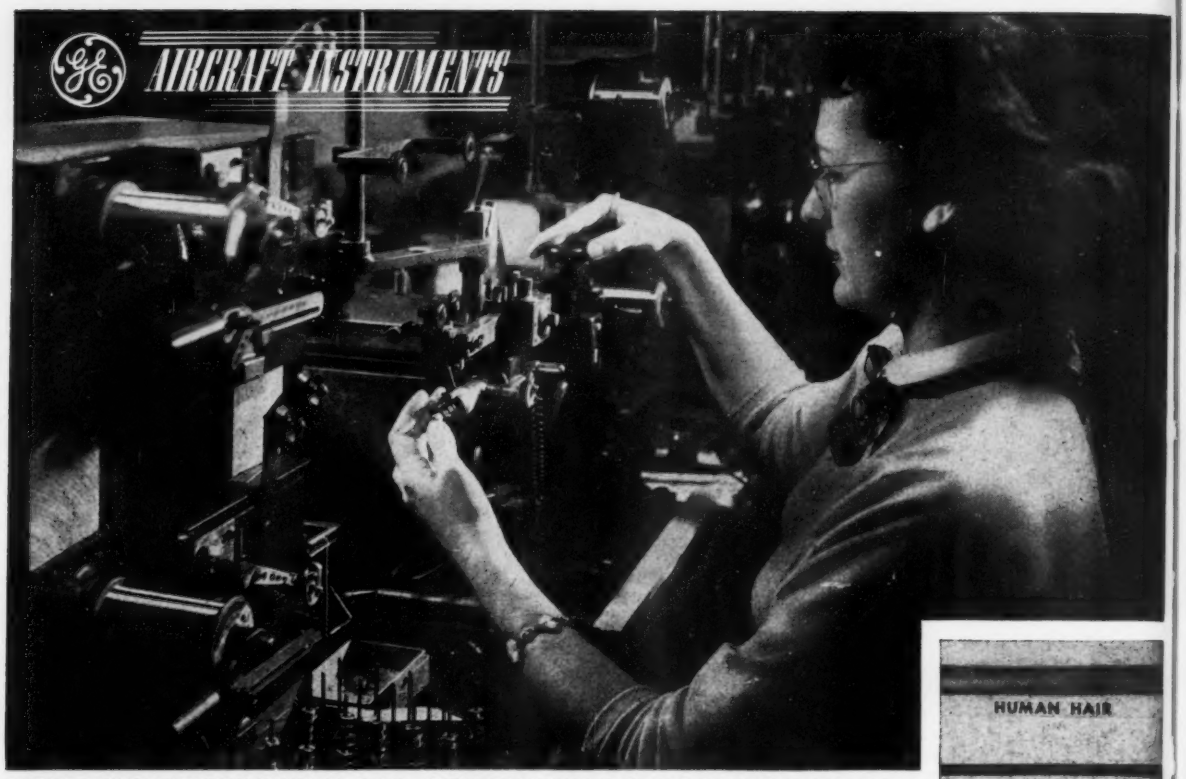
THE PICTURES tell the story of the development of the bomb, as a weapon of war, from the small hand-grenade stage (1911) to a giant explosive so large, so heavy, that it requires the use of a hydraulic lift to load it into the bay of the plane.

In the intervening years, our entire aviation industry has progressed with astonishing rapidity, and the makers of fuels and lubricants have kept pace. Phillips Petroleum Company, pioneer in the field of special aviation gasolines and lubricants, has long been one of the country's largest suppliers of aviation fuels for commercial and military use. And now Phillips is ready with new fuels for turbo-props and jets in addition to its tremendous capacity for producing 115/145 grade aviation gasoline. The Aviation Department, Phillips Petroleum Company, Bartlesville, Oklahoma.

Phillips 66

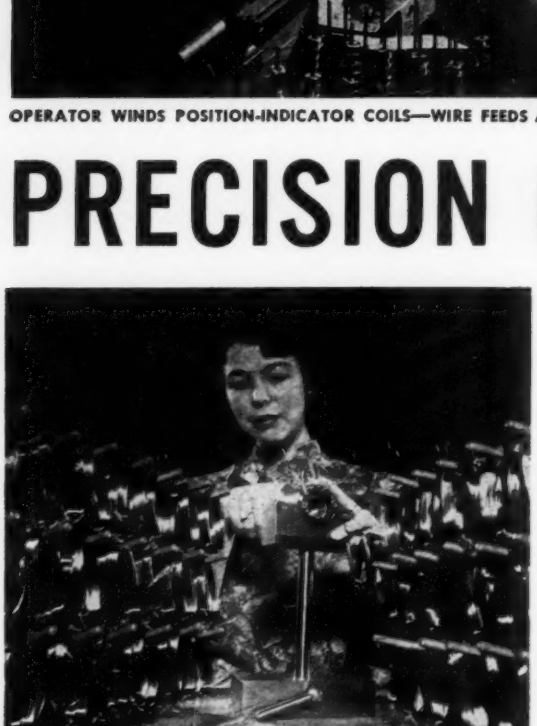
AVIATION PRODUCTS

AIRCRAFT INSTRUMENTS



OPERATOR WINDS POSITION-INDICATOR COILS—WIRE FEEDS AT 600 RPM AROUND SQUARE COIL FORMS.

PRECISION COIL WINDING



COILS FOR TACHOMETER GENERATORS are prewound and inserted in stator slots. They are specially formed and inserted to withstand extreme environmental conditions and excessive vibration.

Special winding machines required to handle 0.00125-inch coil wires

Coils of varying types and sizes are used in General Electric aircraft instruments. Each has its individual coil form shapes, number of turns, and diameter of wire.

For the smaller coils, special winding equipment is needed. Some of these coils require wire diameters as small as 0.00125 inch (about half the size of a human hair). Plastic insulation, occasionally only 0.0002 inch thick, is sometimes stronger than the wire itself. This insulation can stretch—hiding a break in the wire. That's why special equipment and winding methods are required to assure dependable coils.

This is just one example of how General Electric, long a leader in precision-instrument-manufacturing techniques, has applied its engineering and manufacturing facilities to provide accurate, dependable aircraft instruments. For information about available instruments, contact your G-E aviation specialist or write Section 607-24, General Electric Company, Schenectady 5, New York.

Sixty-seven years of instrument experience—

GENERAL ELECTRIC

607-24

NEWS DIGEST

DOMESTIC

Personal and executive plane exports of planes 6,000 lb. and less empty airframe weight came to 19 during August, valued at $122,016, compared with 34 planes worth $194,028 shipped out the previous month.

The 22d Bomb Wing, flying B-29 Superfortresses, has been transferred to England. It was the third European tour of duty for the wing. It returned two years ago from its most recent duty in England and last summer saw combat in Korea.

Igor I. Sikorsky has received the 1951 Daniel Guggenheim Medal and Certificate in recognition of his long and pioneering services to aviation.

U. S. and Portugal have signed an agreement which is expected to permit North Atlantic Treaty Organization nations to use bases in the Azores for common defense. The agreement replaces the post war arrangement by which the U. S. uses Lagens Field in the Azores. A State Department spokesman said that it provides "certain new rights in addition to those already in effect".

Bernard Reedman, 43, advertising manager of Vickers, Inc., died Sept. 16 of a heart ailment. He had been with the firm since 1943.

First of several hundred North American T-6G Texan trainers to be manufactured at Columbus, Ohio, has been successfully test flown four months after the job was begun at this location. The plant will also build the F-86F Sabre, AJ-1 Savage and FJ-2.

Korean air battle score from last February, when the first enemy jet was shot down, through Sept. 11, shows 72 MiG-15s shot down as against 16 United Nations jets destroyed by the enemy.

Shipments of civil aircraft, measured in airframe weight, amounted to 435,700 lb. in June, totaling 216 planes valued at $8.1 million. May totals were 248 planes worth $10.7 million. Backlog of planes of 3,000-lb. weight and over increased from 574 in May to 576 at the end of June. June saw 362 aircraft engines totaling 166,000 hp. shipped.

Kaiser Metal Products, Inc. has received a subcontract from Republic Aviation to build and assemble F-84 Thunderjet aft fuselage sections at Bristol, Pa.

Three MATS C-97 Stratofreighters have set records of over 300 flight hours in a single month on Pacific division runs; respectively 315 hr. 30 min. (10 hr. 13 min. daily utilization); 314 hr. 15 min.; and 300 hr. 40 min. Previous high for the plane was 291 hr. 48 min., held by a PAA stratocruiser.

Boeing-Wichita is calling for 3,000 additional employes to work on its high-priority B-47 stratojet production project.

Lockheed Aircraft Service, Inc., has turned over operation of the USAF base at Keflavik, Iceland, to MATS. A subsidiary, Lockheed Aircraft Overseas Corp., has operated the base since July, 1948. Commercial air operation at the international airport was simultaneously taken over by the Icelandic Government.

First combat aerial refueling in the Korean fighting is claimed for a North American RB-45C jet reconnaissance bomber and a Boeing KB-29 tanker. The RB-45 from the 91st Strategic Recon Wing was commanded by Capt. James H. McGrath, and the tanker, from the 91st Air Refueling Squadron, was piloted by Capt. Robert Hall.

FINANCIAL

Delta Air Lines has declared a 25-cents-per-share dividend payable Oct. 17 to stockholders of records of Oct. 1. Two similar dividends were paid this year in April and July. Delta finished its fiscal year June 30 with a $1,631,798 net profit after taxes and predicted net profits of approximately $145,000 per month for July and August after taxes.

Temco has completed its $10-million V-loan line of credit with the Federal Reserve Bank of Texas to aid in taking care of $135 million worth of defense production contracts the organization has secured.

INTERNATIONAL

French SO-30 transport, a Nene turbojet-powered version of the SO-30 Bretagne, has successfully passed its initial flight tests, attaining speeds approaching 500 mph.

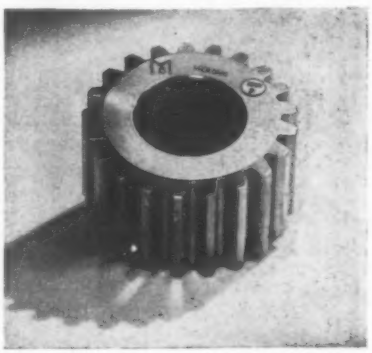
We're up to our Ears

...and we like it —and we know what caused it...

At IGW, your precision gear problem is engineered and scheduled efficiently —then produced on modern equipment operated by skilled craftsmen— and controlled by rigid inspection.

Result . . .

. . . you like it—and you know what caused it.



This planet pinion has .0003 MICROWN* —IGW's new after-grinding, high precision crowning process.

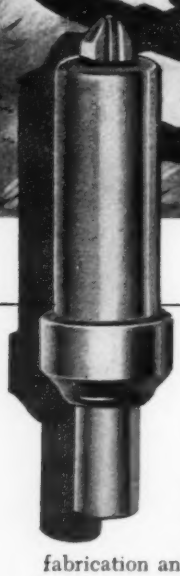
*PATENT PENDING

Indiana GEARS

GEARS • CAMS • INTRICATE AND PRECISE MACHINE PARTS

INDIANA GEAR WORKS • INDIANAPOLIS 7, IND.

standard of the aircraft industry



COUNTLESS THOUSANDS

of aircraft have been built faster and better with 3H safety clamps

Since the beginning of World War II, 3H Safety Clamps and applying tools have proved their superiority in high speed sheet metal fabrication and other applications in the aircraft industry. Today 3H Safety Clamps are preferred many times over all others because of their advanced design, operational efficiency, safety and adaptability.

3H Safety Clamps are quickly and easily applied and removed, with maximum safety. They hold securely under all conditions and withstand considerable abuse.

The several basic types shown below are available in sizes to fit various size drill holes and thicknesses of material. Special clamps can be developed for your specific requirements. Write today for catalog.

MONOGRAM MFG. COMPANY

2204 Colorado St. • Santa Monica, Calif.

AVIATION CALENDAR

Oct. 2-4—Seventh annual aircraft spark plug and ignition conference sponsored by the Champion Spark Plug Co. of Toledo.

Oct. 3-6—Annual national aeronautical and engineering display and aircraft production forum, sponsored by Society of Automotive Engineers, Biltmore Hotel, Los Angeles.

Oct. 4—33d annual meeting of the American Ordnance Assn., Cincinntai, Ohio. Tour of Wright-Patterson AFB is included in meeting.

Oct. 8-10—Sixth annual convention, National Defense Transportation Assn., Plaza Hotel, San Antonio, Tex.

Oct. 8-10—Special conference on aircraft electrical applications, sponsored by the air transportation committee of the American Institute of Electrical Engineers and the Los Angeles section of the Institute, Hollwood Roosevelt Hotel, Hollywood.

Oct. 9—Air transport section, National Safety Council, Palmer House, Chicago.

Oct. 11-12—1951 conference on airport management and operation, University of Oklahoma, Norman, Okla.

Oct. 13-14—Air fair at Los Angeles International Airport.

Oct. 15-18—Society for Non-Destructive Testing, eleventh annual meeting, with symposium on jet engine part inspection, Hotel Detroiter, Detroit.

Oct. 16-17—Fourth annual New York State conference on airport development and operations, sponsored by the N. Y. State Dept. of Commerce, N. Y. Aviation Trades Assn., Assn. of Towns of the State, Conference of Mayors, County Officers' Assn. and the N. Y. State Flying Farmers, Onondaga Hotel, Syracuse, N. Y.

Oct. 22-24—National Electronics Conference & Exhibition, Edgewater Beach Hotel, Chicago, Ill.

Oct. 29-30—Air Industry & Transport Assn. of Canada annual general meeting, Seigniory Club, Montebello, Quebec.

Oct. 29-31—National transportation meeting of Society of Automotive Engineers, Hotel Knickerbocker, Chicago.

Oct. 24-25—1951 annual convention of the National Assn. of State Aviation Officials, Arizona Inn, Tucson, Ariz.

Oct. 31-Nov. 1—Society of Automatic Engineers, fuels and lubricants meeting, Drake Hotel, Chicago.

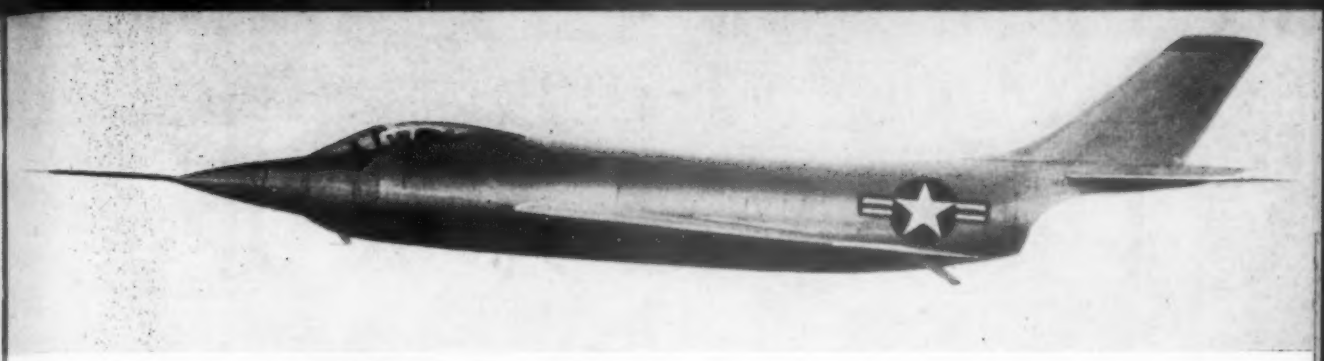
Nov. 7—Annual Wings Club Dinner, Waldorf-Astoria, New York.

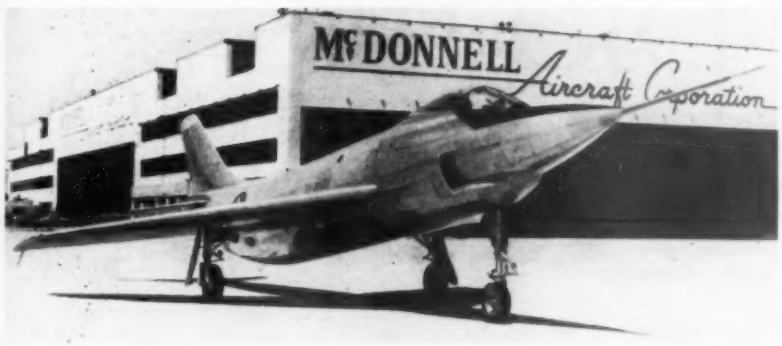
Nov. 8-9—Seventh annual national conference on industrial hydraulics, sponsored by the graduate school of Illinois School of Technology and Armour Research Foundation, Sherman Hotel, Chicago.

Dec. 4-5—Transport aircraft hydraulic accessory and system conference, Hotel Sheraton, Detroit.

PICTURE CREDITS

9—(Demon photos) McDonnell; (Helio Courier) Howard Levy; (Pipers) Piper; 14—McGraw-Hill World News; 15—Combine; 18—(Attacker) Keystone; (Hawker) Wide World; (Supermarine 508) McGraw-Hill World News; (SA-4) Keystone; 45—IATA.





NAVY ACCEPTS DEMON—Latest views, including a flight photo, of new McDonnell XF3H-1 Demon carrier-based jet fighter scheduled for large-scale production by its designer and by Goodyear Aircraft Corp. Powered by a Westinghouse J-40, the Demon is believed to be in the 700-mph.-plus class. Noteworthy points include the unusual fuselage configuration at the tail (above) and the very cleanly designed air intakes below the cockpit. The XF3H-1 first flew Aug. 7.

Picture Highlights of the Week

HELIO COURIER ALOFT—First flight view of the new Helio Courier four-placer, which made its debut at the Detroit National Air Races, shows the craft with slats and flaps extended. Powered by a Lycoming 260-hp. engine, the Courier has a speed range from about 30 mph. to 150 mph. Features include a large, slow-turning Aeromatic propeller and an engine muffler for very quiet flight.

PIPER GRASSHOPPERS LINE UP—First dozen L-21 Super Cubs, powered by Lycoming 125-hp. engines, are lined up prior to delivery to the Army Field Forces, which will use them for liaison duties. The L-21 is also available with twin-wheel tandem landing gear.

new book explains

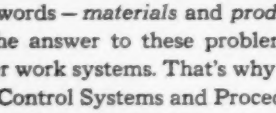
Practical Production Control

Most of your manufacturing problems today can be summed up in two words – *materials* and *production.*

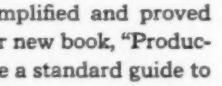
The answer to these problems lies in simplified and proved paper work systems. That's why we know our new book, "Production Control Systems and Procedures," can be a standard guide to material and production planning and control in your plant, whether it is large or small.

This book outlines actual case histories based on the vast combined experience of practical men who solved the complex production control problems of a regulated economy. These men now bring you, free, their analysis of simplified means for coordinating men, materials, and machines.

Here are a few of the practical ideas you will find in this book . . .



. . . How to keep up maximum output, curb costly production delays – by using SCHED-U-GRAPH CHART BOARDS to set up long-range, flexible production schedules, and to provide positive control of machine loads and parts needed for assembly-line operations.



. . . How to detail advance requirements of parts and raw materials for effective procurement action – with PUNCHED-CARD TABULATION SYSTEMS that "explode" bills of materials mechanically, quickly; and also provide the facts needed to prepare CMP allotment applications.

. . . How to maintain coordinated control of requirements, advance ordering, receipts and inventory of each item of parts and raw materials – in KARDEX VISIBLE CONTROL SYSTEMS that flash positive warning of threatened shortages or overstocks, so that prompt corrective action may be taken.

"Production Control Systems and Procedures", Form No. X1268, will show you how these proved ideas can help solve your production control problems. For your free copy, phone our nearest Business Equipment Center. Or write to Room 1399 Management Controls Reference Library, Remington Rand Inc., 315 Fourth Avenue, New York 10, N.Y.

Remington Rand

WHO'S WHERE

In the Front Office

Howard Holmes has been named vice president-general manager of development and contracts for Simmonds Aerocessories, Inc., Tarrytown, N. Y., and **M. I. Benton** has been designated vice president-general manager for the firm's plants located in the Vergennes, Vt., area. Holmes joined the company in 1942, formerly was associated with Western Electric. Benton came to Simmonds in 1940, has been in charge of manufacturing operations at the Vergennes plants since World War II.

Frank M. Salisbury has been made president of Lafayette Metal Products Co., Inc., succeeding **C. R. Van Scoy** who retired recently. Salisbury's previous position was as vice president-engineering. Prior to joining Lafayette, he had been with Douglas Aircraft, Hughes Aircraft, Interstate Engineering Corp., and Airborne Equipment. Lafayette is now engaged in making precision aircraft, missile and electronic components.

Changes

Cy Fenn has been named assistant chief engineer in charge of Edo Corp.'s Mechanical division. . . . **Warren A. Shuping** has been designated manager of quality control at the Fairchild Aircraft division, Hagerstown. New department directors at this plant include: **Phil Harr**, quality control; **J. Earl Steinhauser**, plant operations; and **S. T. Mulroney**, materials.

William H. Van Camp has been designated sales engineer in the Southern California area for Adel division, General Metals Corp. . . . **Don Balfour** has been named factory manager at Texas Engineering & Mfg. Corp., Dallas, Tex.

F. Donald Fenhagen is the new manager of public relations and advertising at Bendix Radio division of Bendix Aviation, Baltimore, succeeding **Leo G. Sands** who has taken another post in Detroit. New sales appointments in the division: **Henry B. Yarbrough** has been promoted to manager of government sales: **J. Walton Colvin** has been made manager of USAF sales; and **Walter G. Jager** has been named assistant manager of government sales. **Alan Kahn** has been appointed industrial relations director of Bendix Aviation's Utica, N .Y. division.

Richard L. Bean has been appointed publicity manager of Lockheed Aircraft Corp., succeeding **Ned Root**, who went to Convair. **W. Dean O'Connor** has been named head of Lockheed Aircraft Service's commercial department at Burbank. . . . **S. R. Wagler** has joined Selig Altschul, Aviation Advisory Service, as senior research associate.

E. J. (Bud) Huber, public relations director for Piasecki Helicopter Corp., has resigned to take up a similar post beginning Oct. 7 with an East Coast helicopter firm. **Walter Bishop**, Piasecki industrial relations director, also left the company late last month, but hasn't revealed his future plans.

INDUSTRY OBSERVER

►Navy's temperamental and very high-speed Chance Vought F7U Cutlass fighter will soon go into squadron service after a "bug" extermination service program which was probably as extensive as any in recent experimental plane history. Production model is the F7U-3, powered with two Westinghouse J-46 engines. First of the really transonic Navy jet fighters, in the around-700-mph. class, the Cutlass will also probably be the first Navy plane in service which can compete with the sweptwing Russian MiG 15s on a speed basis.

►McDonnell Aircraft Corp. developments of short afterburners have been a well-paying by-product of the firm's ramjet engineering program for helicopters. First of the junior-length afterburners was developed for McDonnell's F2H Banshee, but more recently experimental contracts have been received to design and build "shortie" afterburners to fit new model Allison and General Electric turbojets, although neither of these engines currently is used in a McDonnell plane. Until now all the McDonnell jet fighter designs announced have used Westinghouse jet powerplants.

►Navy is demoting Grumman F9F-2 and F9F-3 Panthers and McDonnell F2H Banshees to second-line jet fighter status in fiscal 1952, with the explanation to Congress that the airplanes have been outperformed on the front line by the Russian MiG-15 jet fighter, "the final test of whether or not an airplane is first-line." Navy now calculates that first-line life of a fighter is from 2½ to 3 years.

►Packard Motor Car Co. will be able to produce all the smaller forgings for its J-47-23 and J-47-25 jet engine production at the new Utica, Mich., assembly plant, including its own buckets and blades, as a result of its new forge plant capacity being added in Detroit.

►Continental Motors' entry into the gas turbine field by getting license for nine types of French Turbomeca-developed turbines for American production may mean the first practical step in this country toward long-awaited turbine power for small business and utility planes. Probably the first aircraft applications of the engines, which cover a wide range of relatively low powers, will be military—for target planes, guided missiles, helicopters, and liaison craft. As the largest postwar manufacturer of small piston aircraft engines, Continental should know the problems of small aircraft powerplants thoroughly. There is already industry speculation as to how long it will be before there is a Continental Motors Trophy race for midget planes powered by turbines, replacing the piston-engine midget racing event which the company has been sponsoring.

►Northwest Airlines is restudying its proposal to install Sperry engine analyzers in its Stratocruiser fleet (page 35). After NWA issued a press release stating it had decided to adopt the Sperry unit, Bendix Scintilla renewed its efforts to sell its own analyzer (AVIATION WEEK Apr. 2, p. 34) to Northwest. So the airline has delayed placing an order with Sperry until it concludes its investigation of the Bendix device.

►A turboprop 50-92 passenger transport that will carry a 25,000-lb. payload at 350 mph. over a still air range of 3,100 mi. at a mean altitude of 31,000 ft. is what the Bristol Aeroplane Co., Ltd., is aiming to have in its new Type 175 transport, designed for long range BOAC routes. The 175's Bristol Proteus turboprops rate at 3,200 shaft hp. plus 800 lb. thrust each. Cabin is pressurized for operations to 35,000 ft. Until the jet de Havilland comet can stretch its range, the Model 175 will be the British plane for Americans to beat on the trans-Atlantic route, U. S. airline observers say.

►Pratt & Whitney T-34 turboprop engine originally rated at 5,700 hp. is now rated up to 6,000 hp., indicating at least a slight step-up in power from the rating of a year ago. P&WA has awarded a major subcontract to Allis-Chalmers Mfg. Co. to help build the T-34, scheduled as the powerplant for USAF's giant YC-124B transport.

Washington Roundup

The New Secretary

A Naval aviator in World War I and the Assistant Secretary of War for Air who directed the boost in bomber output from three to four a month up to 1,000 during World War II, Robert A. Lovett is regarded in Washington as the first genuine air enthusiast to fill the top Defense post since it was established by the 1947 Unification Act.

Aviation men, though, are keeping their fingers crossed. They recall the case of ex-Defense Secretary Louis Johnson.

Aviation circles were warm to his appointment: Johnson, as pre-World War II Assistant Secretary of War for Air, was billed in the press as a sparkplug for air power.

But they soon were warm for his retirement: as Secretary, Johnson ruthlessly slashed air power under a banner of "economy."

Count on businessman Lovett to exercise painstaking care and caution on spending defense dollars. He was largely responsible for cutting back the three services' requests for a total $104 billion last January to $66 billion. This difficult undertaking added to his already high prestige with Congress, was performed with a diplomacy that left the services reasonably satisfied.

But count on Lovett, too, to use caution in restraining military expansion—the historic role of the civilian command.

Looming on the horizon as a new problem for the new Secretary: a revived aggressiveness in Navy command.

First speeches by Navy's new Secretary, Dan Kimball and new Chief of Naval Operations, Adm. William M. Fechteler, make it unmistakably clear they will push for more emphasis on Naval aviation in the defense build-up. Said Kimball: "I want a new flush-deck carrier for the Naval air arm every year for the next ten or twelve years."

Navy's New Chief

Expect Adm. William M. Fechteler, new Chief of Naval Operations, to be a conservative on air power.

The admiral's evaluation of its effectiveness: "Air attack alone will not stop the advance of the Russian army against Western Europe. In Korea there has been no appreciable enemy opposition to our use of the air and though we have had a zone of approximately 150 miles over which our air effort was free to operate, there still has been no effective retardation of the enemy advance by means of air alone, including Naval aviation."

But, as between USAF and Naval air power, look for Fechteler to plump for more emphasis on the Naval air arm in the defense build-up.

Fechteler's observation: "Remember always that Naval aviation is an important part of the air power of the U. S.

"A navy, mobile and ready, is an instrument particularly well adapted to the maintenance of force on defensive frontiers far from home.

"I do not mean to suggest that the Navy alone can accomplish the whole business of manning a defensive frontier abroad. Troops are needed which must come from the Army. The power of the Air Force will be required at the scene of prospective action. . . . But the Navy is peculiarly well adapted for a large share of the work. . . ."

On two basic issues, the Navy's new Chief puts himself in diametric opposition to USAF's leadership:

- **Should there be "balanced" forces? Or should there be a priority of weapons—with air power, which would have to bear the initial brunt of an attack with retaliation and air defense—getting the top priority?**
- **Will the next war be fought with World War II weapons?**

Fechteler's position on the first point: "To abandon without good reason the proven principle of balance in the provision of armaments in favor of a provision of armaments on the basis of priorities in weapons would not only be wasteful of effort, but would reduce the effectiveness of non-priority weapons to the danger point. . . .

"In fact one of the reasons I so earnestly support the principle of service balance is that a system of priorities in the provision of armaments could result in a curtailment of Naval aviation . . . of steel for tanks . . . etc."

In contrast, this is the position of Chief of Staff Gen. Hoyt Vandenberg:

Vandenberg: "What we have to balance our forces toward is the threat; not against each other. We must balance our forces against the enemy and his forces and his potentials."

Fechteler's view in regard to weapons of the next war: "In all sincerity and with great emphasis, I suggest to you that the next war, if it comes, will be fought by personnel who will be and will remain at or near the scene of action, and that the conventional type of warfare with which we are all familiar has not become obsolete."

Fineletter's contrasting outlook: "We must not stay fixed to hidebound ideas which will no longer be valid once atomic weapons are more plentiful. We must use the new resources we will develop not only to strengthen the strategic operations of the Air Force as we now conceive them but also to find new and novel uses for this vast new resource.

Senate Investigation

Senate Preparedness Committee, headed by Sen. Lyndon Johnson, under the staff direction of Securities and Exchange Commission's vice chairman, Donald Cook, is investigating the defense procurement program from:

- **Performance.** Johnson has long felt that Office of Defense Mobilization and the services are "drifting," aren't spurring deliveries from military producers. The group is gathering extensive data—date of obligation of money, date of contract-signing, date of scheduled delivery, date of actual delivery—with an eye to getting an over-all view as to whether output is generally lagging, or just in spots, and why.
- **Profits.** The committee is looking into the profits over the past ten years of approximately 1,000 major firms, relating them to both capital investment and sales.
- **Defense organization.** The group is evaluating the defense set-up to see if it's properly organized for smooth operation, and operating smoothly.

Johnson observed: "We're interested generally in performance under the defense program, and specifically in any windfalls of government money to contractors."

Investigative staff's spotlight is now on General Motors Corp.'s performance and profits.

—Katherine Johnsen

AVIATION WEEK VOL. 55, NO. 14
OCTOBER 1, 1951

Shake-up Coming in Materials Controls

- **NPA's system of allocations has brought such tangles that even the bureaucrats are worrying.**
- **So look for a return to the World War II set-up of unified controls with one office in charge.**
- **But while the change definitely is in prospect, details can't be worked out much before next April.**

By Alexander McSurely

Defense planners soon will return to the World War II system of unified controls on materials for military aircraft—the system which made attainable the tremendous production records which were achieved by U.S. industry in the mid-1940s.

Reluctantly some key government officials at Munitions Board, Aircraft Production Board and Defense Production Administration are swinging around to the view most of the aircraft industry has held for the last year, that unified controls offer the only system that will work again.

Defense Mobilizer Charles E. Wilson doesn't want to revamp the materials control set-up and make a special place for aircraft components unless he has to. But observers feel the national production authority has made a poor record thus far chopping off materials vital for military aviation, and this has left little choice.

Probably the set-up will not be changed until the end of the first quarter of 1952. That is about as fast as the switch could be made under ordinary circumstances.

▶**Pressure Grows**—But meanwhile pressure is building up to a point where already some aircraft components are getting special materials preference while others still are suffering across-the-board materials allotment slashes. Such a situation is not expected to last much longer than it takes the less fortunate components manufacturers to find out about it.

Then Washington defense agencies will hear from them, it is anticipated, with outcries that will not be denied until they get similar treatment on their military priority production.

Landing gear struts, wheel brakes and at least two other components items have already gotten preferential treatment through Munitions Board, informed Washington sources said last week. With this opening wedge it is not expected that other equally essential components can be denied similar priorities.

Munitions Board opposition to a special controls plan for all aircraft materials, lies in the reasoning that if it is done for aircraft it will have to be done for tanks and other high priority military production. Proponents of the special military control reply: "And what's bad about that?"

▶**The Prescription**—**The new control system, if and when it comes, will probably parallel quite closely the aircraft materials scheduling plan of World War II under War Production Board's Aircraft Division.**

In Washington it may mean less and less emphasis on NPA's Aircraft Division which has never done the job it should in protecting aircraft interests in the over-all economy, in the opinion of most competent aircraft industry observers.

If it had, the new Aircraft Production Board Chairman, Harold Boyer would not have been forced into the trouble-shooting expediter job for the aircraft industry which he has been doing ever since he was appointed to the post in August.

Boyer's appointment was at a policy level as an advisor to Defense Mobilizer Charles E. Wilson, but he has been so busy breaking logjams and putting out fires that his policy reports to Wilson have been strictly from "on-the-run" locations.

Decision on how soon the aircraft materials requirements which still remain on NPA's B lists will be taken off and given some special preferential treatment probably will go to Wilson ultimately. Involved are some high political considerations, which are the

The Trouble With Controls . . .

Here are two of the latest examples that observers cite when they explain why materials for aircraft production inevitably will have to be put under unified control:

Aluminum rivets needed for military aircraft production in the first quarter of 1952 will require 2.8 million lb. of aluminum, Air Force and Navy determined. That much aluminum should be in the hands of the rivet makers in the fourth quarter of this year.

But NPA allowed the rivet makers only 1.5 million lb. of aluminum for the 1951 fourth quarter. With the rivet manufacturers protesting "that serious interruptions in line production of military planes might develop if the additional aluminum were not made available for rivets," Defense Production Administration (NPA's parent agency) dipped into the reserve of controlled materials and parceled out another 1 million lb. of aluminum. That still leaves the rivet people 300,000 lb. shy, and is likely to lead to airframe production delays next year.

Component manufacturers are supposed to apply for materials allocations through prime contractors. But Adel Division of General Motors Corp., for instance, makes a relief valve that is on 100 purchase orders for 25 different manufacturers. According to the book, Adel would have to apply for allocations separately on each purchase order which had to be processed.

Because some of Adel's items are used in both military and industrial production, NPA put Adel in the general industrial equipment section.

So Adel got an N-4 allocation, which is for goods not otherwise classified. Under this, the company got its full allocation for the third quarter of 1951. But its request for a fourth-quarter allocation was rejected when it made application for that period.

real reason why the controls weren't set up differently, in the first place.

▶Butter & Guns—Obviously it goes back to the butter-and-guns philosophy on which the whole present defense program has been predicated. And obviously a special category for all military aircraft materials will mean less materials for some civilian production. But taking a look at the over-all military picture, observers say that it is either civilian or military production that has to feel the squeeze and right now.

If military schedules, already stretched to a dangerous calculated risk in the opinion of many, are to be kept, NPA can't go on making across-the-board cuts on materials which go into military aircraft.

Eventually, Mobilizer Wilson expects this country's productive capacity on materials will be built up to where at least a very high level of civilian production can be maintained along with the military production. But that kind of materials supply is not yet available and until it is, some better insurance has to be provided to keep military aircraft on production schedules.

▶Suggested Plans—Two suggestions are discussed for handling components materials for military aircraft.

- Set up a special new "B-products" list for such components which would have equal priority with other military materials requirements.
- Remove all aircraft components from NPA controls. Current NPA set-up has the Aircraft Division classified within the "Textile, Leather and Specialty Bureau" of NPA.

New pressure on the components materials question has arisen recently, as a result of the general tightening of materials as the Controlled Materials Plan takes effect.

Aircraft component manufacturers generally have been following the old American tradition: "Don't holler before you are hurt." As long as they were getting their materials and even had some for some civilian production as well, they accepted the cumbersome NPA set-up.

But, with a higher and higher percentage of their production becoming military, up to 90% and more in many cases, the across-the-board cuts by NPA on their future materials supplies hurt, and hurt badly, both the individual manufacturers and the aircraft schedules they are committed to fulfill.

Another aspect of the materials question coming up is what to do about APRA, the Aircraft Production Resources Agency, jointly operated by Air Force, Navy and Army, under Munitions Board charter.

A reshuffling of this agency and a redefinition of its powers and duties, which may bring it more closely in line with the old Aircraft Scheduling Unit operated during World War II, may be in the offing. If it should come, APRA or its successor might be tapped to handle the components materials question along with the primary aircraft materials job.

Missiles' Future Stirs Congress

But military now finds that it must caution legislators that time has not yet arrived to drop conventional weapons.

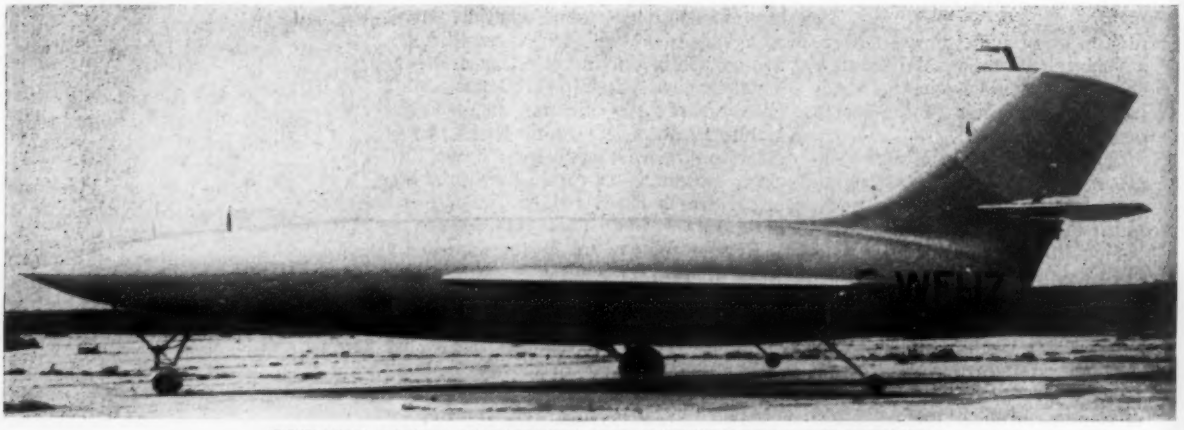
Defense spokesmen now find themselves in the position of trying to hold the reins on congressional enthusiasm for guided missiles which they had formerly tried to stimulate.

The announcement by Army of a contract award to Firestone Tire and Rubber Co. for an undisclosed number of Douglas-designed-and-developed Corporal E tactical missiles, following shortly after USAF's announcement of formation of a B-61 guided missile squadron (AVIATION WEEK Sept. 24, p. 219) has helped bring this situation about.

▶Congress Eager—Last week Sen. Brien McMahon, who heads the Joint Congressional Committee on Atomic Energy, introduced a resolution calling for defense authorities to "go all-out on atomic production and development." In a speech on the Senate floor McMahon asked for an increase in atomic expenditures from $1 billion to $6 billion.

What this nation should have, McMahon told the Senate, is an atomic Army, Navy and Air Force, in place of the conventional defenses we now maintain. McMahon said that the nation's military could do with far less foot soldiers and far more guided missiles with atomic warheads.

Department of Defense spokesmen, following McMahon's enthusiastic appeal for atomic weapons and guided missiles pointed out that we still have no service-tested guided missiles, atomic-powered aircraft engines, artillery or submarines, and that their addition to the military services was still some time distant. Until those items are proved, these spokesmen said, we had better go slow on plans to whittle down the stand-



FRENCH TEST 'MOCKUP' OF SUPERSONIC PROJECT

This wooden glider is an exact flying mockup for the projected Arsenal 2301 supersonic speed project designed at the French government's Arsenal de L'Aeronautique. Span is approximately 28 ft., length about 46 ft. Wings and tail are sharply swept. The glider first flew, towed behind a twin-engine Siebel Si. 204, on May 24, 1951 and has made ten flights in all. Landing gear consists of nose wheel, main wheel beneath the fuselage and outrigger wheels under the wing tips. Although flight tests are said to have been satisfactory, lack of funds has halted construction of the first actual powered prototype.

ing armies and conventional weapons and planes.

The Corporal E, first of several scheduled for production for Army tactical ground operations, is said to be about 40 ft. in length and weigh about 12,000 lb., including a sizeable warhead. Due to its assignment to tactical combat operations, range of the Corporal E probably falls between 50 and 60 miles. And based upon performance of other Corporal series missiles in the Douglas Aircraft family thus far revealed, this latest weapon presumably would have a maximum velocity capability between Mach 4 and 5.

▶**Previous Missiles**—Although the Martin Matador is the first guided missile weapon to enter production and weapon status for service use in the United States, the Douglas WAC Corporal, another in the Corporal series, claims distinction of being the first guided missile of any type to be designed and built entirely in the country.

It was Army's WAC Corporal which set a 1949 altitude record of 250 miles. Established at Army's White Sands Proving Ground, N. Mex. the record was made by sending the WAC aloft in the nose of a captured German V-2. The WAC was fired from the nose of the V-2 after it had climbed to 100 miles altitude becoming in effect a two-stage rocket. The WAC then under its own power climbed another 150 miles and attained a top speed of something over 5,000 mph.

Entry of the Martin Matador and the Douglas Corporal E to weapon status marks the beginning of a new aspect of war, for these are the first true U.S. guided missiles. The field of such weapons first gained prominence during World War II with German utilization of the V-1 buzz-bomb and V-2 rockets, but the trajectory or course of these could not be altered materially while in flight.

Another type of remotely controlled missile developed from World War II experience is the Bell Tarzon bomb—a free-falling bomb whose course may be controlled during vertical descent. There have been other air-launched missile test vehicles such as Razon and the Navy Bat developed in the latter stages of World War II, which were never wholly satisfactory.

Aluminum Supply Depends on Rain

The possibility that power shortage might force re-allocation of huge Pacific Northwest aluminum production plants of Reynolds, Kaiser and Alcoa was under study in Washington last week. Such a move could have far-reaching effects to aviation manufacturers.

With aluminum as one of the key materials used in aircraft production, the moving of approximately one-half the nation's aluminum producing plant capacity obviously could cause a severe dislocation of materials scheduling, particularly among the many West Coast companies which are principal sources of U.S. military aircraft and guided missiles.

A spokesman for the Office of Defense Mobilization told AVIATION WEEK that the whole question could be settled by a matter as simple as three inches of rainfall. Defense electric power administration has warned that low water levels in rivers from which the Washington-Oregon-Idaho region gets its power, may make necessary a power "brown-out" in the area.

At a Washington press conference last week Henry J. Kaiser announced that he had proposed to Defense Mobilizer Wilson immediate solutions to the current power shortage in the Northwest until additional power dams scheduled to turn 1,650,000 kw. additional into the Northwest system could be utilized.

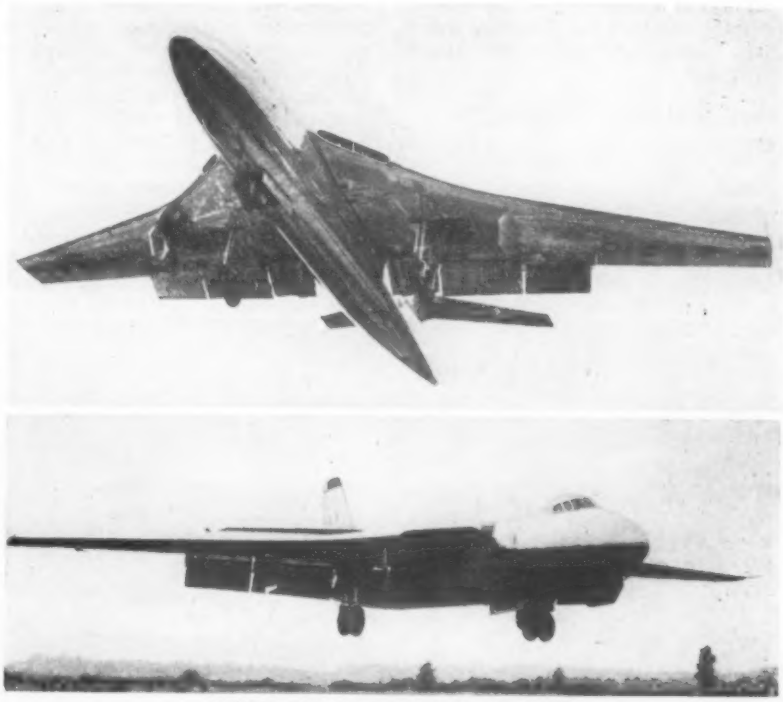
Kaiser proposed curbing non-essential and needless use of electricity and augmenting existing power by using ships as floating powerplants, or diesel electric locomotives as emergency power sources. He said that relocating the Northwest aluminum production would not be economic or practical and would result in loss in aluminum capacity, greater than if the Northwest potlines remain in their present locations until economic power is available.

▶**Those Affected**—Five aluminum-producing plants in Oregon and Washington and two planned in Washington and Montana will have a combined output of about half the nation's total supply. They include:

- **Reynolds**, Troutdale, Ore., 72,000 tons a year, and Longview, Wash., 30,000 tons;
- **Kaiser**, Spokane, 125,000 tons, and Tacoma, 25,000 tons.
- **Alcoa**, Vancouver, 85,000 tons, and scheduled new facility at Wenatchee, Wash., 80,000 tons.
- **Harvey Machine Co.**, scheduled new facility at Kalispell, Mont., 54,000 tons.

Defense Mobilizer Charles E. Wilson had sent telegrams to all the major aluminum producers instructing them to draft plans for removal from the Northwest to other areas, and submit them for further consideration in the over-all defense mobilization plan.

The planning move was interpreted in Washington as a warning from Wil-



VALIANT SHOWS ITS STUFF

These views of the new Vickers 660 Valiant four-jet (Rolls-Royce Avon) jet bomber taken during the recent SBAC show at Farnborough, point up the interesting wing planform (top photo), and the large flaps which can be extended sharply (bottom view). The engines are completely housed within the inner wings, with under fairing for the tail-pipes carried to the inner flaps. The tandem-wheel main gear folds outward and has large cover plates. The 660's large bomb-bay doors are also noteworthy. First of Britain's new four-jet bombers, the Valiant is in production for the RAF.

son to conflicting federal and private power interests to reconcile their differences, blamed for some of the difficulties involved in the power shortage, and produce an answer to the increased defense needs for electric power in the Northwest. If they can't or won't, then the plant moves may follow.

▶**Power Claims First**—It was also learned that the Interior Department, which had been responsible for diverting some of the water supply in the rivers for irrigation uses, had agreed to give power claims on the water supply first call until the situation was eased.

Activity on the proposed new aluminum plants at Wenatchee and Kalispell was expected to be suspended pending a decision on the power availability. A $42-million defense loan authorization for the Harvey plant has already been ordered held up for further investigation of the project.

Two eastern World War II aluminum-production plants, stripped of their equipment, were seen as possible alternate operations. But here too the availability of needed power was a question mark. The plants, now vacated, are at Burlington, N. Y. and at Maspeth, L. I.

If the brownout order goes into effect, DEPA said, only users completely exempted will be the atomic energy plant at Hanford, Wash., the Spokane magnesium plant, and the Pennsylvania Salt Co. plants at Tacoma and Portland.

Air Force Defends Shepard Resignation

Events surrounding the resignation of Brig. Gen. Horace A. Shepard took a mysterious turn last week when Air Force spokesmen refused to answer press queries concerning reasons why Shepard was able to leave USAF for employment by one of its prime contractors, Thompson Products.

Shepard, who resigned his commission early last month to accept a vice presidency with the Thompson company, told the Associated Press in reply to a congressional request for explanation for his resignation: He was "not a career officer" but had "paid for his own education" at Alabama Polytechnic Institute. He pointed out that he had resigned, rather than retiring, and thus sacrificed accrued pensions. He stated, "my work with Thompson Products is more important than it was with Air Force."

Some official quarters took offense at Shepard's quoted remarks due to the fact that he had held an extremely important Air Force post as Director of Procurement and Production Engineering in the Office of Deputy Chief of Staff for Materiel.

No official comment with regard to that point was available, however. There was also dissatisfaction with the logic represented by Shepard's reference to the fact that he had paid for his own education.

Representative Walter R. Norblad had asked Air Force Secretary Finletter for an official explanation of why Shepard, who had been in charge of procurement, had resigned "with your approval and obtained employment with a manufacturing company in Cleveland which manufactures the parts of jet engines used by our Air Force." Norblad pointed out that he had introduced a bill which would bar retirement of career officers prior to age 62, except for physical or mental disability. Shepard is 38.

Air Force denied to AVIATION WEEK that Shepard's employment by Thompson Products was in violation of Air Force Regulation 30-30. Reports had come to AVIATION WEEK after circulating within the aircraft industry and the Air Force that this regulation provided for cancelation of a contract, if an Air Force officer, involved in procurement of a specific item, resigned to join a company which was contracting to supply this item to the Air Force. These reports are labeled false by official Air Force spokesmen.

In commenting on Shepard's resignation, Air Force would state only that Shepard's move had been sanctioned by top Air Force officials and that details of Shepard's move to Thompson Products would be explained to Congress by Finletter. Contents of Finletter's letter could not be disclosed, Air Force said.

FAIREY TURBOPROP COPTER PROJECT

Artist's conception of the Fairey Rotodyne 20-plus-passenger copter now under development at Hayes, Middlesex. The Rotodyne is powered by two Armstrong Siddeley Mamba turboprops from which air is bled and fed to the rotor tips where it is ignited to provide power for turning the four-bladed main rotor. An interesting innovation will be installation of auxiliary ramjet units mounted on the rotor blade tips to provide emergency power and to aid takeoff. Note the unusual high-wing layout.

No Settlement Seen In Douglas Strike

Strike of 10,400 members of United Auto Workers (CIO) against the Long Beach plant of Douglas Aircraft Co. entered its fourth week with no sign of early settlement.

The union's determination not to yield on its major points was further indicated by the statement of UAW national vice president John Livingston that strike moves would get under way last week at Douglas' Tulsa, Okla., plant.

Livingston declared "The Tulsa local has met the same refusal to bargain on basic UAW contract demands that Long Beach workers have endured." But the company claims that the Tulsa local has not disclosed its demands, nor appointed a negotiating committee.

At Long Beach, UAW is asking a 6% pay increase retroactive from October, 1950, to April, 1951; a 10% increase from April to date; and a 10-cents-an-hour across-the-board increase. Douglas countered with an offer of a 10% increase, with no retroactive provision, and an across-the-board increase of 6 cents. The company also agreed to an escalator clause tied to the cost-of-living index.

The union further is asking for the union shop, pensions, company payment of all insurance premiums, and 50 other benefits such as automatic progression. Douglas objects specifically to this last feature, claiming it destroys initiative.

Meanwhile, raw materials have added to Douglas' strike woes. Materials are moving into the Long Beach plant at a rate of $1-million worth a day. The company feels it will not have sufficient warehouse space, and also that material-short manufacturers may get government support to take over the stock now piling up for Douglas.

Air Show Tragedy Results in CAA Ban

The Civil Aeronautics Administration henceforth will allow no air shows except "when it is shown that such activities will contribute directly to the advancement of, and public confidence in aviation."

CAA also prohibited from now on: aerobatics without direct radio control, delayed chute jumps, dog fights, "crazy" flying, crashes on purpose.

The agency laid down these rules and the Civil Aeronautics Board promised additional regulations last week after a recent air show accident took 20 lives at Flagler, Colo.

What was apparently intended as a daring low-altitude flourish by an Air Force lieutenant off duty flying a civilian light plane ended in mass tragedy. Lt. Norman Jones attempted a roll 100 ft. above the spectators and the upside-down plane fell into the crowd.

As soon as the dead and 20 others injured were removed, the two CAA agents on the scene started an investigation.

They report that Lt. Jones' death-dealing stunt was totally unscheduled. He was flying his plane into Flagler from Denver to land for his instructions on the regular show.

Since he was just arriving, he had not been briefed on the safety rules of this air show. The CAA rule prohibited flying lower than 500 ft. and nearer than one-half mile from the crowd. The CAA agents said they had briefed all the other pilots and expected to brief Jones after he landed. Lt. Jones was on active duty with the Air Force at Lowry AFB, Denver.

CAA officials say such an accident would not happen if the pilot follows the safety rules, including flying 500 ft. high and half a mile away. A CAA safety agent sets up the rules for each air show. He bases them on consideration of terrain, size of the crowd, and other such matters. Then his rules are binding on the operator as a condition of his waiver from the standing CAA regulation prohibiting flying lower than 1,000 ft. over crowds and assemblies.

Military Decides on Heptane Test Fuel

Over industry objections, Air Force and Navy have decided that by Jan. 1, industry shall switch to a new test fuel for calibrating carburetors and fuel metering components. New testing fluid is normal heptane.

Industry says a switch over to a new test medium at this critical time in mobilization will delay production. Presently, several test mediums are in use, but industry had agreed Stoddard Solvent type would be best to standardize on when appropriate time for standardization came.

But Navy and Air Force want to standardize now on the volatile heptane. They like heptane because it is 90% pure and contains no aromatics to contaminate the component tested and thereby result in shortened shelf storage lift.

Industry counters these claims to superiority with a long list of advantages for Stoddard Solvent. Stoddard is cheap and easy to get and it can be controlled so as not to deteriorate much. It is not hazardous to handle. When it does get contaminated, it can be used up mixed in with fuel for engine run-ups. And aromatic content contamination of the component is not important, they say, because the component when it goes into service life uses fuels that also contain aromatics.

CAB Asks Revision Of West Coast Fare

A CAB examiner wants the airlines to change radically the transcontinental ticket fare pattern, bucking rail and bus competition and the airlines' own business sense.

For nearly half a century, trains, buses, and later the airlines have quoted the same fare from Chicago to any big city on the West Coast. And they have attracted additional tourists by offering the same fare for a tour to both Northern and Southern California as the roundtrip to one West Coast city.

CAB Examiner F. Merritt Ruhlen proposes a new airline fare structure: customer to pay 5% more to San Francisco than to Los Angeles, and pay the same 5% more to make a swing through both coastal cities. The airlines—chiefly transcontinental carriers American, Trans World, and United—bitterly oppose being the guinea pigs for his theory. They say competitive experience shows that more passenger revenue comes from offering common fares than from upping the prices for certain segments of the various alternative routings available.

SBAC Official Sees U.S. Comet Market

A number of United States airline officials want to order Comets, provided the British industry can deliver them in a comparable time to that offered for American piston-engine machines. That is the report of W. T. Gill, president of the Society of British Aircraft Constructors, speaking at Farnborough.

To meet this challenge, and get the big chance to break the hold of American aircraft manufacturers on the foreign transport market, the British industry is asking the government to help it get the labor and materials to speed production. The industry believes that with enough workers it can step up production of these civil export planes at the same time as it fulfills its military contracts, Gill says.

SBAC Delegation To Tour U.S. Plants

A delegation from the Society of British Aircraft Constructors (SBAC) will arrive in the United States Oct. 4 for a one month's tour of major U. S. aircraft and engine manufacturing plants and military installations as guests of Aircraft Industries Asso. and the Department of Defense.

Members who have indicated that they will make the tour are: W. T. Gill, president of SBAC and director of Rolls-Royce Ltd.; Sir Kay Dobson, deputy president, SBAC and managing director of A. V. Roe Co. Ltd.; V. W. A. Dickson, director and general manager, aircraft section, Vickers-Armstrong; W. R. Verbon Smith, joint manager and director, Bristol Aeroplane Co., Ltd.; C. C Vinson, joint assistant managing director, Fairey Aviation Co. Ltd.; H. G. Nelson, deputy managing director, English Electric Co., Ltd.; Rear Admiral M. S. Slattery, managing director, Short Bros. and Harland Co., Ltd.; E. Sayers, deputy chairman SBAC and representative of 279 accessory component manufacturers, Thompson-Houston Co., Ltd.; S. E. Clotworthy, deputy chairman, SBAC, and representing 91 raw materials and components manufacturers; and D. A. Tomlinson, secretary and financial advisor, Rotol Co., Ltd.

AF Organization Now Set by Law

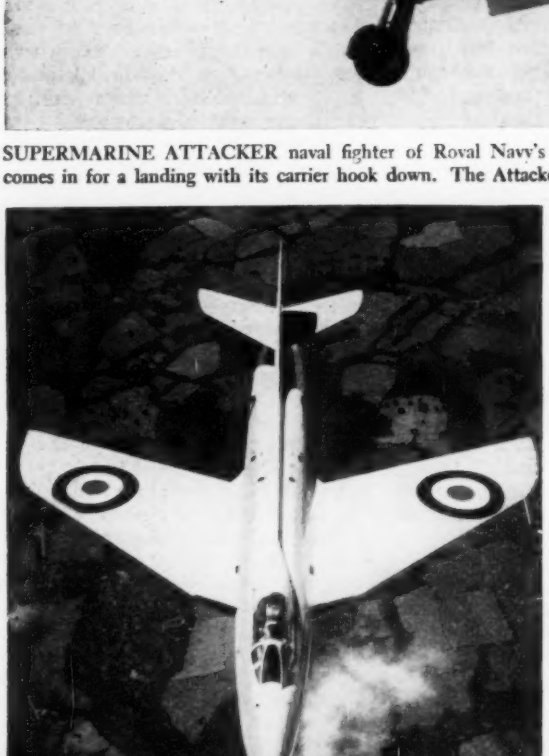
Air Force last week was granted a charter which provides basis for its internal organization and structure, when Pres. Truman fixed his signature to the Air Force Organization Bill.

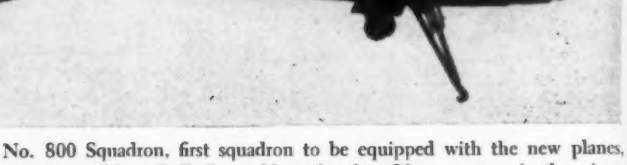
The law officially decrees that the USAF establish strategic, air defense and tactical commands and any other the Air Force Secretary deems advisable. Although these commands had been operating administratively they had had no legal backing and could have been abolished at any time.

The bill also limits Air Force headquarters (Pentagon) personnel to 2,800 officers and places a 4-year limit to Pentagon duty.

New Foreign Military Developments

SUPERMARINE ATTACKER naval fighter of Roval Navy's No. 800 Squadron, first squadron to be equipped with the new planes, comes in for a landing with its carrier hook down. The Attacker is powered by a Rolls-Royce Nene, has four 20mm cannon in the wings.





SUPERMARINE 508 (above) banks steeply at low-altitude, showing the bulky fuselage housing two Rolls-Royce Avons. Another characteristic is butterfly tail. Though not swept, the wings are of very thin section. HAWKER P.1067, left, (Rolls-Royce Avon) in plan view, showing swept wings and tail, also external "spine" extending along top of fuselage. P.1067 is in quantity production for RAF.

SHORT S.A.4 four-jet bomber shows double engine nacelles, each having two Avons. Note deep fuselage and four-wheel landing gear.

HANDLEY PAGE MARATHON II transport in closeup displays new de Havilland four-blade reversible pitch props.

FINANCIAL

NAL Readies for Proxy Battle

Carrier, with sharp earnings increase in last year, expects victory over dissident stockholders' group.

With its fiscal year ending June 30, National Airlines, Inc., is among the first air carriers to issue its annual report for 1951. Addressed to "stockholders, employes and friends," the National report highlights significant developments of the company for its year just ended. There is no doubt as to the attempt to win friends. It is not unlikely that the company went to special pains to put its best foot forward to counteract the anticipated stockholders' proxy contest. (As this will appear, the annual meeting will have been completed with the National management expected to prevail on all if not most issues in dispute.)

▶**CAB Attitude**—With the so-called dismemberment case against the company dismissed, a more kindly attitude is currently expressed toward the Civil Aeronautics Board. In the 1950 annual report National asserted: "The CAB has effectively blocked our attempts. . . ." In the 1951 annual report the company now asserts: "The CAB has handled most expeditiously the large volume and variety of cases before it in recent months." National further declares: "We are confident the CAB will settle the subsidy and other pressing issues wisely."

For the year ended June 30, 1951, National showed total gross revenues of $24,554,760, a gain of 54.21% over a year ago. Net earnings after taxes totaled $2,589,073, or $2.59 per share. This was the highest in National's history and represents almost a five-fold increase over 1950, when net earnings aggregated $558,270, or $0.56 per share.

National lays claim to having the highest net operating income compared to total capital investment of any of the 16 domestic scheduled airlines for 1950. National showed a return of 26.25% on this basis.

Of dubious character, however, is National's assertion of being the lowest-cost operator in the industry. This claim is based on operating cost per available ton mile. This is hardly a fair measure and can in fact be applied to prove over-scheduling.

Of sounder validity and of common acceptance is the measure of operating cost per ton mile actually flown. On this basis, National places fourth for 1950, with an average cost of 47.95 cents per ton mile. American was the lowest-cost operator last year with an average of 41.36 cents per ton mile.

▶**Mail Pay Need**—National also shows a decreasing dependence upon mail pay. During its 1950 fiscal year, 11.22% of its total revenues was derived from mail pay. For the 1951 period this ratio was reduced to 7.08%. The company asserted that its mail pay, which yielded $0.1170 per mile, was one of the lowest per mile rates in the industry. However, on a ton mile basis it is more than four times that of the "Big Four." For 1950 National received $2.74 per ton mile. This compared with 63 cents per ton mile for the "Big Four" as established as a permanent rate for 1950.

The "Big Four" mail rate has been reduced to 45 cents a ton mile for 1951, which would tend to create a further disproportionate spread between this group and National. However, subsequent to the release of its report, National had announced its intention of petitioning for lower mail rates. This may anticipate action from the CAB which has previously declared that its staff was surveying mail rates for a group of air carriers with the likelihood of issuing "show cause" orders imposing reductions (AVIATION WEEK June 4, p. 59).

National's financial position, while declared to be sound, actually shows a slight decline in net working capital. At June 30, 1951, net working capital aggregated $1,430,616, down slightly from the $1,653,545 shown at June 30, 1950. The actual cash position, however, is substantially improved, up from $1,819,751 to $6,063,984.

▶**Net Worth Up**—Of greater significance is the material improvement in the company's net worth position. This is up from $6,753,766 to $8,842,839, a gain of almost 31%. This was after declaration of two cash dividends of 25 cents each in the first six months of 1951. This was the first cash dividend disbursement in the company's history.

Fixed amounts had a net depreciated value of $7,146,501 at June 30, 1951. This was largely represented by flying equipment and consisted of eight DC-6s, six DC-4s and 11 Lockheed Lodestars.

On July 19, 1951, National purchased 174,000 shares of its common stock from W. R. Grace & Co. at $14.375 per share. This represented a capital outlay of more than $2,500,000. Up to Aug. 30, 1951, 68,000 shares of this stock was resold at a reported average price higher than that acquired in July. While the indicated remaining outlay of about $1,500,000 may appear to be a strain on the company's financial position, such a condition is more apparent than real.

Mention is made of the company's incentive bonus plan authorized in 1949. A total of 176 employes were reported to have received average bonuses of $3,057 during the last fiscal year. This would aggregate $538,032 for the group. The proxy statement however, indicates that of this amount, $239,225 or about 45%, was paid to a total of 16 officers and directors.

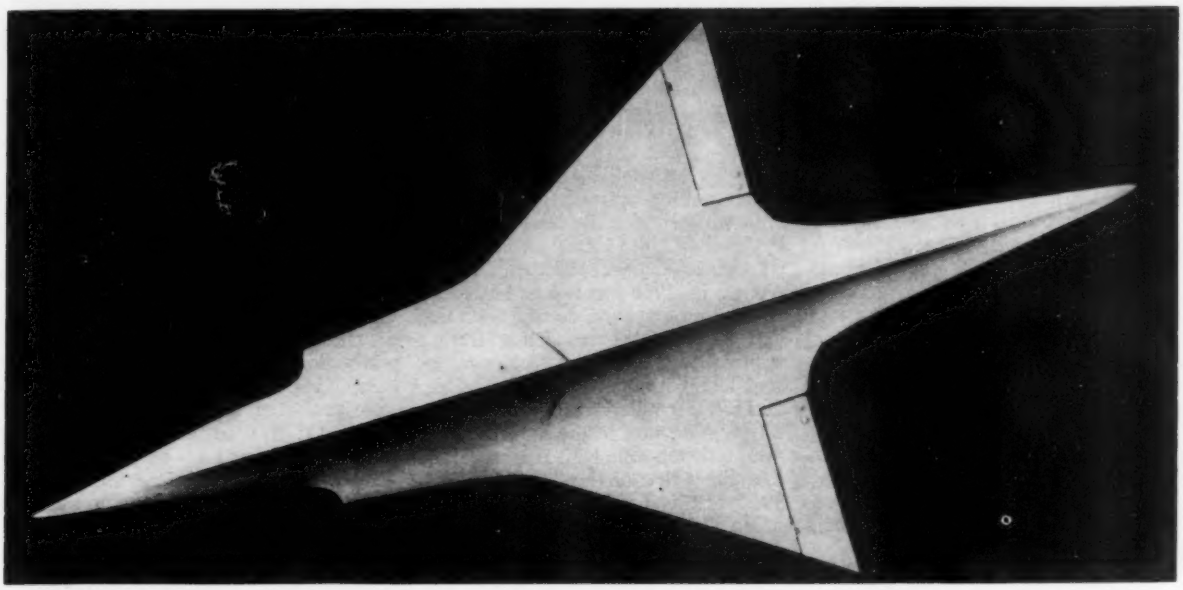
National has agreements to purchase six DC-6Bs, together with the necessary engines, at a total outlay of $6,716,000. Of this amount, $228,948 had been made in progress payments at June 30, 1951. With deliveries of the new equipment scheduled through the fall of 1952, the company should experience little difficulty in paying for these acquisitions.

In the proxy materials released by the "Independent Stockholders' Committee" reference is made to projected capital expenditures amounting to as high as $15 million. Should this be the case, although this estimate is not endorsed by the management, the company with its current earnings' record can readily finance this broad program. At June 30, 1951, a short-term unsecured bank note payable was outstanding in the amount of $2 million.

Increased bank loans may be obtained or additional common stock sold. Presumably this may be one reason why the management desires to have available for general corporate purposes the 588,465 shares of common stock previously reserved for issuance to W. R. Grace & Co. and Pan American World Airways, Inc., in connection with the since canceled interchange agreements.

▶**Stock Option**—At present, 1,000,000 shares are issued and outstanding. Along with the 588,465 shares to be released for general corporate purposes, 11,535 additional shares are reserved for the exercise of options granted ten officers at $11.37 per share. Should all of these shares be issued, there will then be 1,600,000 common shares outstanding.

Any contemplated financing moves may go forward following the reelection of the management expected at the stockholders' meeting. It is known in any event that the 106,000 shares remaining from the W. R. Grace & Co. transaction are for sale. This may be combined with a larger stock offering together with arrangement of an extended bank credit. —Selig Altschul



SUPERSONIC SCHEME for water-based plane combines delta wing with blended hull, as in this dynamically similar flying model.

Flying Boat Designs Meet Highspeed Goal

Research at Convair develops new theories to widen crafts' use.

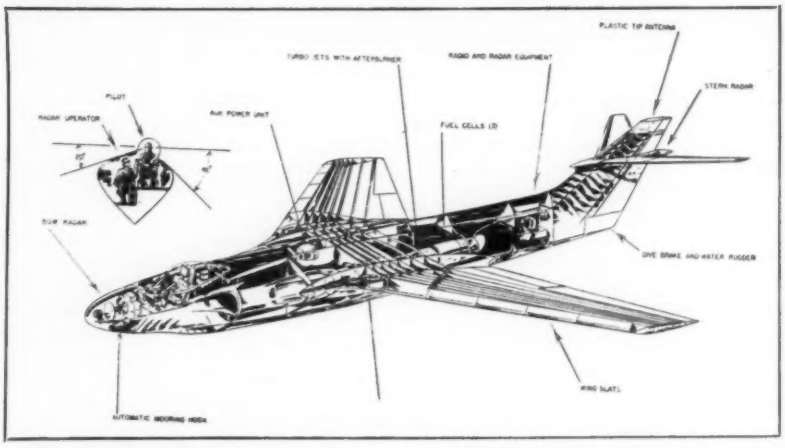
Aerodynamic and hydrodynamic refinements have been teamed to lay at rest the weary argument of "seaplane vs. landplane" in the highspeed regime. There now appears to be no reason for distinction between the seaplane and the landplane in this region.

Intensive studies at Consolidated Vultee Aircraft Corp.'s hydrodynamic research laboratory have resulted in a satisfactory solution for water-basing "idealized" aerodynamic configurations.

Early efforts in the development of the relatively slow flying boat leaned heavily on the technology and experience of the naval architect. But in Convair's new and progressive approach to highspeed, water-based aircraft, its engineers ditched these old "fundamentals" and adopted a new concept based on these premises:

- An aircraft is, first, an integrated vehicle designed to operate as an efficient aerodynamic configuration.
- And, secondly, some means must be provided to permit transition from the ground—or water—to flight and back to the takeoff surface.

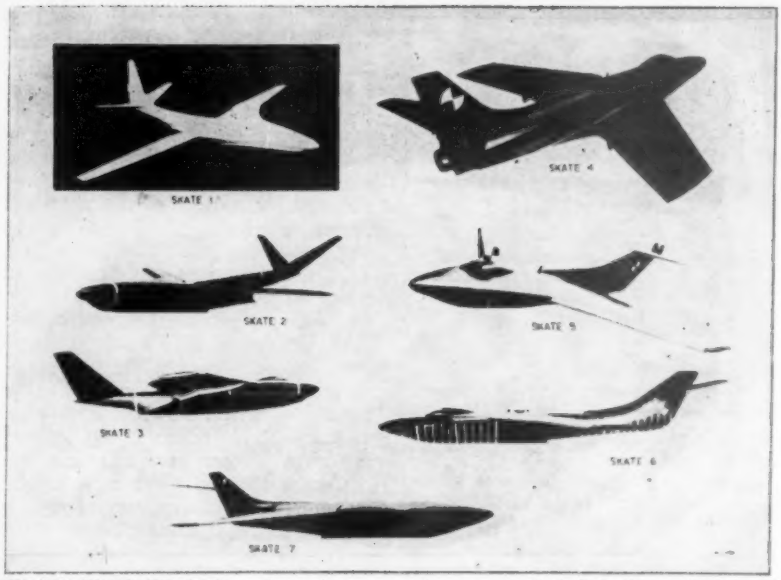
Based on this approach, it was reasoned that all aircraft of a specific category should be highly refined aerodynamic configurations having, in general, the "same" appearance regardless of their transitory requirements. Carrying this thought further, the conclusion was that there need be no difference in the performance of a land or water-based aircraft having the same aerodynamic mission.



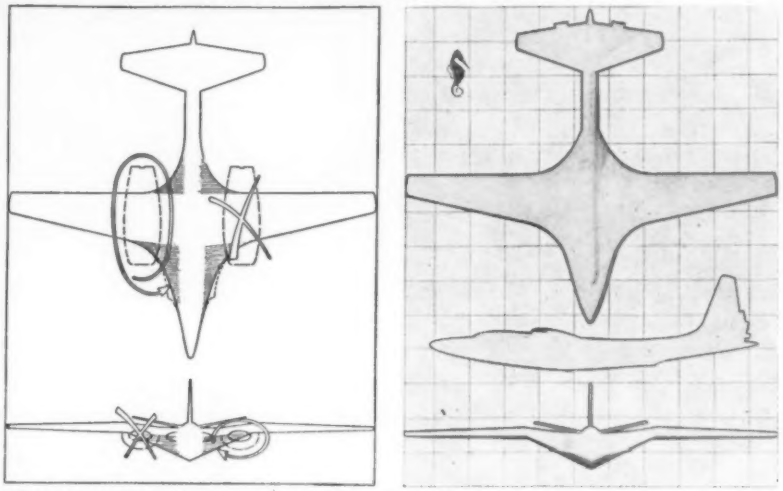
TRANSONIC VERSION of twin-engine, water-based fighter-bomber, representing a gross of about 40,000 lb., shows space afforded by blended-hull configuration.

How Convair engineers went about proving out this theory is detailed in a paper "A Review of High-Speed Hydrodynamic Development," by Ernest G. Stout, assistant to Convair's chief engineer, before the recent third international joint conference of the Institute of the Aeronautical Sciences and the Royal Aeronautical Society, at Brighton, England (AVIATION WEEK Sept. 10, p. 18).

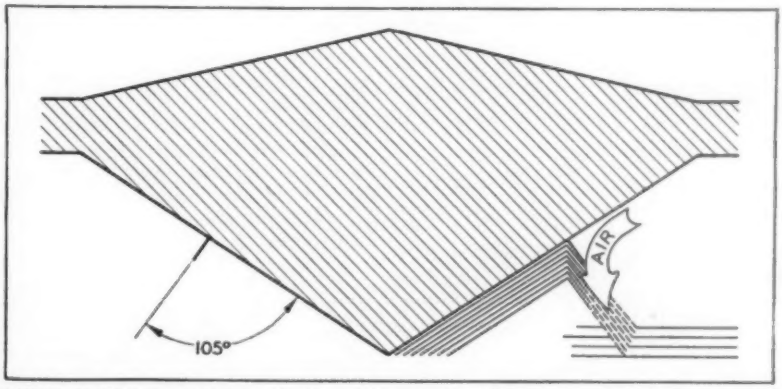
▶ **'Model' Approach**—In Convair's research, the dynamically similar model technique has played a vital role. It was used in England, and introduced in the U. S. by Stout, who is considered one of the country's leading hydrodynamicists. Beginning in 1943, Convair started the development of free-body, dynamically similar models which



SKATE PROJECT—highspeed seaplane research program—included the evaluation of hydrodynamic characteristics of these seven, sleek dynamically similar models. Experience gained with each was passed on as refinements to succeeding models.



XB-46 MODIFICATION scheme (left) to give flotation and low aerodynamic drag. Fillet fairing reduces thickness ratio and accommodates engine. Right: three-view aspect of XB-46 water-based model. This configuration became Skate No. 1.



SPRAY DAM played vital part in Convair's research. This spray control device, a metal strip on the hull bottom, violently agitates main spray blister, mixing it with air, giving high-force, aerated stream having little or no rebound from surface.

were self-propelled and remotely controlled by positioning multichannel radio.

Success of this project gave Convair a practical research tool that not only gave impetus to its studies but saved time and expense and introduced a large factor of safety in proving out the merits of a prototype before it was actually constructed—witness the XP5Y-1, the Navy's patrol transport turboprop flying boat (AVIATION WEEK Nov. 29, 1948, p. 22).

After Convair's subsonic research program for the U. S. Navy gathered sufficient design criteria for the proposal of the turboprop-powered XP5Y, company engineers went ahead with another study for refining water-based aircraft.

▶ **XB-46 Basis**—They realized that the successful development of a highspeed, propeller-driven configuration would provide only a temporary answer until steps were taken to incorporate pure turbojets into an efficient hydrodynamic form.

Because propellers were to be eliminated, says Stout, the initial study resolved into an effort to minimize hull height and still provide adequate spray clearance for air intakes and critical structure.

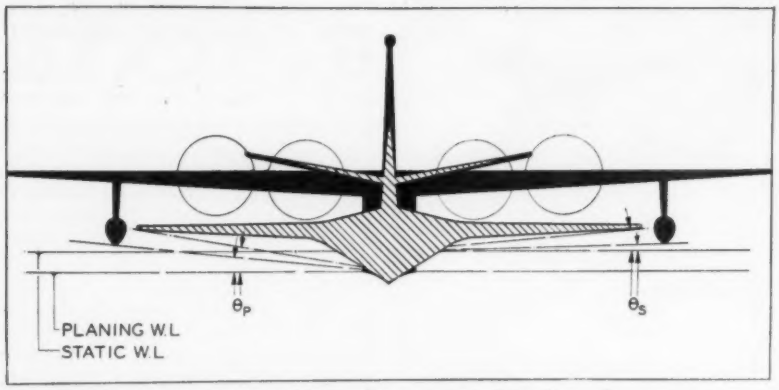
Convair had just completed the XB-46—its first jet-propelled bomber—hence it appeared logical to start with this design and water-base the model with minimum revision.

Various approaches were made using extreme length-beam ratios, light loading and other schemes. But all of these configurations incorporated the basic elements of conventional hulls, such as sharp chines and steps, and did not provide the static buoyancy or spray control required without excessive frontal area—hence, aerodynamic drag.

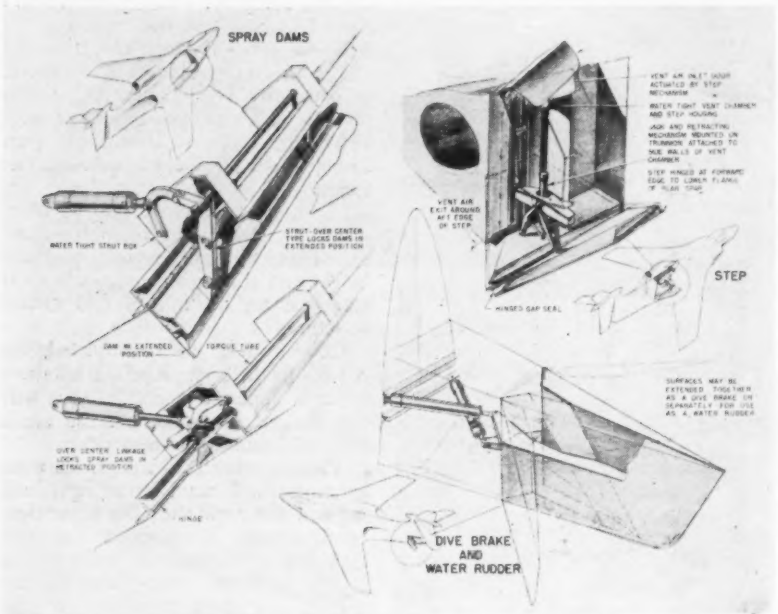
▶ **Spray Action**—At this point, an earlier and promising development—the vertical spray strip—was brought into the picture. This scheme had been devised because the conventional V-bottom hull, long used in research on planing phenomena, had never proved satisfactory for a seaplane because of the great height to which spray would rise on leaving the chine. Hence, rule-of-thumb criteria had dictated some form of transverse curvature—chine flare.

When extreme overloading of conventional seaplanes became a critical factor, extensive studies were undertaken to determine effect of modification of transverse curvature on spray height.

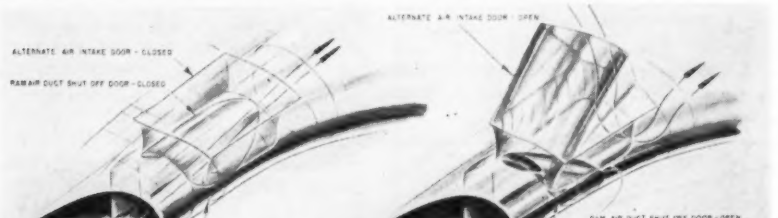
It was found that a radius too small would act only on a layer of water immediately adjacent to the hull and the inertia of the unaffected mass would carry it past the local curvature with little change in direction. Also, if reflex flare were employed, the adjacent layer



COMPARISON of blended-hull design with conventional seaplane of same gross.



MECHANICAL DETAILS of spray dam, main step, and water rudder-dive brake.


ALTERNATE AIR INTAKE DOOR - CLOSED
RAM AIR DUCT SHUT OFF DOOR - CLOSED
WATER DRAIN DUCT - CLOSED
ALTERNATE AIR INTAKE DOOR - OPEN
RAM AIR DUCT SHUT OFF DOOR - OPEN
WATER DRAIN DUCT - OPEN

ALTERNATE INTAKES provide air while at rest and at low maneuvering speeds.

TAILPIPE CLOSURE DOOR keeps out large slugs of water when plane is moored.

would rebound from the unaffected mass and rise higher than if there were no flare at all.

► **Spray Dam**—It was then concluded that the most effective control was obtained by a generous radius covering roughly one-third of the bottom and terminating with a horizontal or slightly downward direction at the chine. A simple means was employed—a metal strip attached to the hull without flare. This strip was progressively deflected and the spray height recorded.

There was no improvement beyond a few degrees of the horizontal, where the reflected spray steadily became worse. The study was continued, says Stout, and when the strip approached a near-vertical position an interesting phenomenon occurred—there was marked reduction in the spray height. The increased effectiveness apparently was due to the sharp intersection of the strip with the bottom, in effect acting as a dam. This was the promising scheme Convair resorted to in its new water-basing studies with the XB-46 configuration.

► **Departure From Tradition**—In this research, says Stout, there was complete deviation from established naval architecture practice.

A generous wing-hull fillet was added to the original XB-46 configuration, and to keep the thickness ratio of this addition within aerodynamic reason, the planform was faired generously into the bow and stern of the fuselage. Because frontal area had been increased, this was offset by eliminating engine nacelles and housing the powerplants within the fillets.

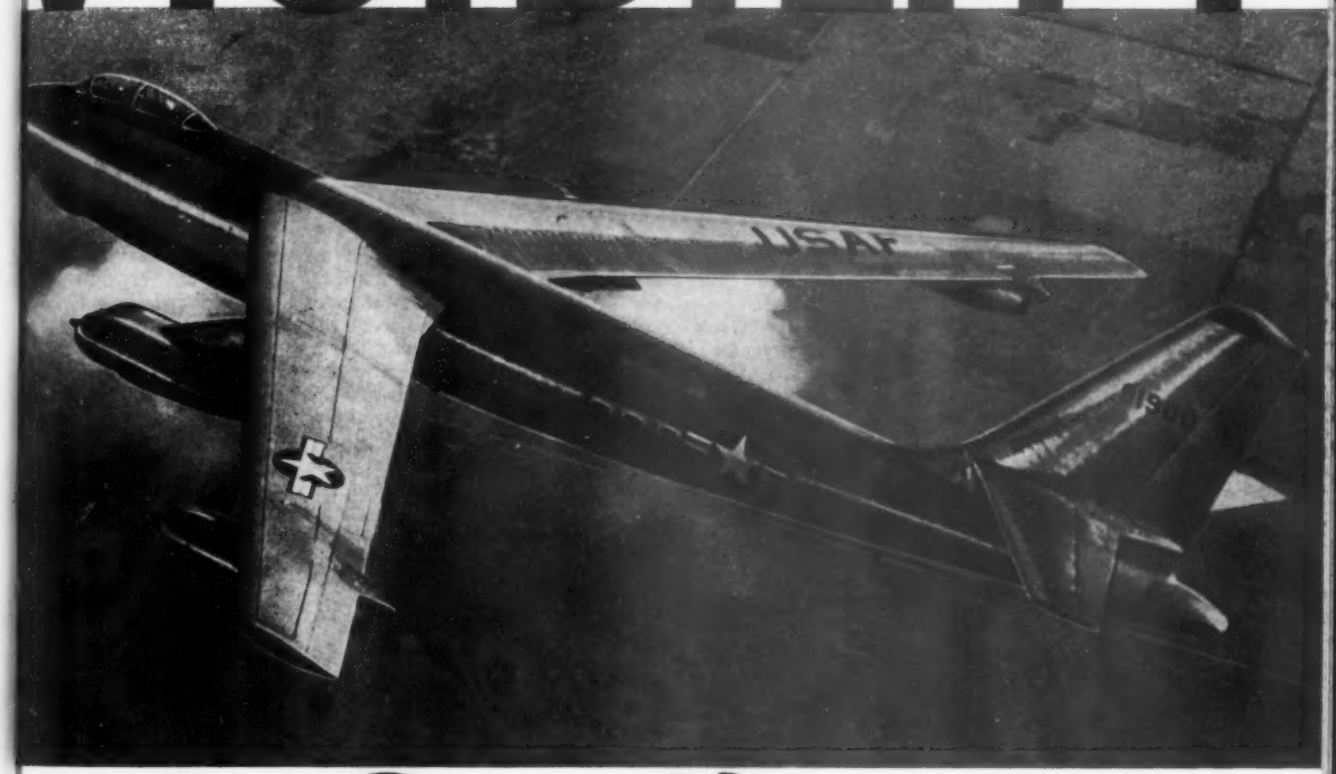
If spray dams on this smooth fillet could give adequate spray control the basis for a practical design would be established—particularly with spray dam retraction in flight.

A simple bridle-towed dynamically similar model was built, largely retaining the basic airframe of the XB-46, to check hydrodynamic characteristics, which were found to be encouraging. After minor revisions in the spray dam and step it was concluded that spray could be controlled at the design gross and that hydrodynamic stability was satisfactory.

► **Suppression Action**—These tests showed that the spray dam was effective because it violently agitated the main spray blister, mixing it thoroughly with air. The aerated mass is deflected down with great force in a high-velocity jet and penetrates the free water surface with little or no rebound. The high-velocity curtain so generated effectively contains the mass of water not directly contacted by the dam.

The dynamic model showed that the bow wave at a speed for maximum bow spray was completely suppressed. At no point did the spray reach a height

VISIBILITY



by Swedlow

The BOEING B-47 stratojet is the fastest known bomber in the world. This great six-jet engine powered, swept-wing bomber will be produced in quantity for the U.S. Air Force by Boeing Airplane Company, Wichita, Kansas, the Douglas Aircraft Co., Tulsa, Oklahoma and the Lockheed Aircraft Corp., Marietta, Georgia.

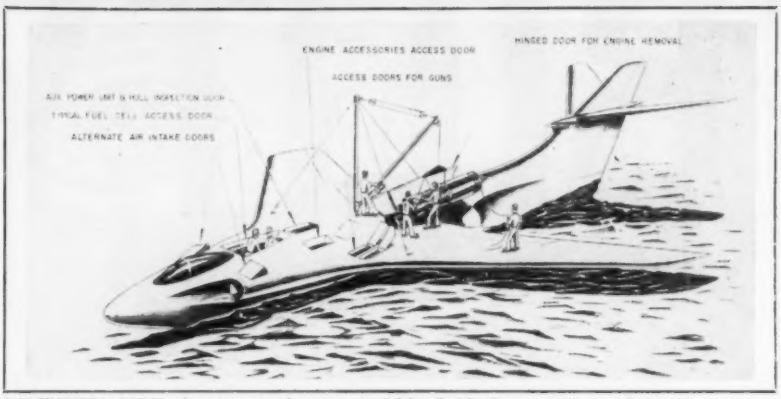
Transparent laminated canopies and all-nylon fuel cell backing (in accordance with Boeing specification BMS-8-13) are SWEDLOW's contributions to the admirable functional efficiency of this superb fighting machine.

SWEDLOW was selected as a major supplier of these important factors because of SWEDLOW's unique reputation and more than a decade of experience in the development and fabrication of vital parts for the aircraft industry.

● ***We shall be glad to assign our staff engineers to work with you in solving problems in all phases of plastic fabrication.***

Swedlow PLASTICS CO.

LOS ANGELES, CALIFORNIA • YOUNGSTOWN, OHIO



MAINTENANCE plan for attack version of blended-hull transonic configuration.

greater than the dam. At a comparable loading, the bow wave on a conventional hull with sharp chine and flare would go completely over the wing. Additional tests in moderately rough water and crosswinds also showed satisfactory operation, except that some form of wingtip flotation was needed to assist the very low righting moment inherent in this basic design.

Adaption of the XB-46 to a water-based configuration was, strictly speaking, a subsonic development. But it was carried forward to collect preliminary data applicable to the installation of jets in transonic and supersonic water-based designs.

Upon reviewing the results with the modified XB-46 dynamic model, the Navy granted authorization for a research program designed to combine the benefits of the spray dam investigation with a study of completely smooth aerodynamic forms of high critical Mach number.

▶ **Blended Hull Concept**—Adaption of transonic aircraft design to water-based operation, without sacrificing any of the high standards of hydrodynamic performance which already had been introduced, indicated that a radical approach was necessary.

It appeared logical, reports Stout, to start with an ideal aerodynamic configuration and, through hydrodynamic research, develop new principles and applications which, though different in concept, would result in the same degree of seaworthiness and stability normally associated with the best hulls of conventional forms.

It was obvious that the in-flight configuration had to be a smooth, unbroken form with high critical Mach number sections throughout. And to insure elementary flotation, there would have to be sufficient body volume so that engines, air inlets, exhaust openings would not be subjected to flooding action.

Combination of these two requirements and the spray-dam data from the XB-46 studies led logically to a "blended wing-hull" as the most promising approach to the basic research problem.

Now it was necessary to develop a fundamental set of lines to meet the aerodynamic and flotation requirements, also to provide a basis for the construction of a series of dynamically similar models for the research.

▶ **Aerodynamics Stressed**—First step was to select a desirable transonic sweptwing planform and thickness ratio from a strictly aerodynamic viewpoint. The center portion was gradually thickened to a maximum at the centerline to give the required body depth for flotation. For efficient utilization major portion of this volume was placed below the normal chord plane.

Desired aerodynamic thickness ratio was maintained through the thickened center section by increasing the chord in this region in direct proportion to the increased thickness. The best of hydrodynamic design practice was incorporated where it did not compromise the basic aerodynamic criteria previously established.

It was found that straight transverse and buttock sections could be used in the hull without altering the critical Mach number. These alterations, says Stout, provided a good planing section of adequate deadrise to absorb water loads incident to high speed operation. And because of the increased chords, required in the region of thickness transition, adequate planing length was provided for good hydrodynamic operation.

It was also established that this elementary body, because of its low CG and high water-plane inertia, would float upright without auxiliary devices such as tip floats.

And it became increasingly apparent that a true aerodynamic form could meet adequately, or in some cases exceed, many established hydrodynamic design criteria.

▶ **Skate Project**—Principal problems of the blended hull hydrodynamic research were recognized as water separation and control at the boundaries of the planing surfaces, and detailed data on such items as stability during takeoff and landing, waterlooping, low-speed maneuverability, etc. Investigation of these factors became the "Skate Project" (AVIATION WEEK Oct. 23, 1950, p. 14) and consisted of nine basic evaluations.

With the blended hull, it was possible to vary the length-beam ratio between broad limits by appropriate location for the retractable spray dams.

A previously developed "beam selection" chart was found to apply very well to the blended hull. Stout compared, by illustration, a typical blended-hull form to an appropriately scaled comparable view of the XP5Y-1. He noted that the critical spray clearance, which in the conventional case is the bottom of the propeller, was very nearly the same for the blended design. He observed that when it was considered that the spray dam has proved more effective than transverse curvature and a sharp chine, the comparison became even more valid.

Because the interaction of aerodynamics and hydrodynamics is so pronounced on blended forms, a precise criteria is not as simple as in the conventional case, hence a specific evaluation is indicated for each design.

To facilitate dam retraction, says Stout, it was desirable to locate the dam on a straight element of the planing surface and run it well forward. For best results it would be located vertically on the hull so that about one-third of its length to the center of buoyancy is out of the water at static rest. Tail spray is practically eliminated and there appears no necessity for carrying the dam aft of the step.

In most cases, a full-scale depth of 5 or 6 in. for the dam was found to be sufficient.

To prevent spanwise spread of afterbody water, a fixed chordwise fence was installed at inboard end of the ailerons.

▶ **Step, Waterloop Data**—The step is also retractable. It receives forced ventilation because it has no access to the atmosphere at the chine. The moderate air requirements were easily obtained from a small forward opening deck scoop. Step has a 45-deg. planform with an extended depth at the keel of 9-10% of the width. Step plates, in extended position, fair with the straight buttocks of the forebody because any discontinuity here would give severe porpoising instability.

No curvature of the forebody can be tolerated for at least 1½ beams forward of the step, and this coupled with ventilation for an adequately deep step, will give excellent takeoff and landing stability for the blended hull.

A majority of waterloops with conventional seaplanes may be attributed to the float burying in the waves at

high water speeds, as a result of uncontrolled roll. Stout reports that the blended-hull configuration has its CG below the metacenter, that is, it has ship stability. Thus, the tendency to roll, and magnitude of roll, under same conditions of wind and sea, will be considerably less than with the conventional seaplane. An appreciably higher angle of roll is required to bring the Skate-type wing into the water as compared to the conventional float position. Extensive catapult landing studies of blended-hull designs, up to roll and/or yaw angles of 20 deg., have demonstrated no tendency to waterloop, says Stout.

Studies were also made of combination dive brake and water rudder. High water loads required that brakes be closed at water contact. But as speed decreased slightly they were very effective to slow the aircraft rapidly, and used as a rudder the brake gave excellent low speed maneuverability.

Alternate air intake doors and tailpipe closures were also developed. These are not required for normal operation, tests indicated, but gave protection for the static or moored condition, where large slugs of water could break over these openings.

▶**Mach .95 Example**—Numerous design studies have been made covering all transonic requirements from single-place fighter to long-range patrol bomber. Stout gave data on a typical intermediate type, twin-engine, 40,000-lb.-gross fighter-bomber, as an example. Requirements dictated a thin wing and moderately high sweep. Wing loading (about 45 lb./sq. ft.) and airplane size were established on basis of moderate takeoff and landing speeds and on fuel required to give a reasonable range. Structural weight, fuel for cruise, and water clearance considerations led to aspect ratio of 4 and taper ratio of 2.5:1 for this study.

An NACA 0008-64 wing section was chosen on the basis of favorable pressure distributions for high speed, and a relatively large leading edge radius favorable for stalling characteristics. This section was used on the outer wing panels and blended into similar sections used to develop the hull shape.

Sweep of 40 deg. at the ¼-chord line was found to be the most satisfactory compromise between compressibility and adverse effects of sweep with respect to lift, stability and control. Shortspan conventional wing flaps and leading edge slats were included to give satisfactory landing and takeoff speeds with freedom from tip stall.

As a result of tunnel tests, an adjustable stabilizer was chosen—NACA 0007-64 section. This lower thickness ratio combined with 41-deg. sweep gave a higher critical speed than the wing.

Windtunnel tests of a model con-

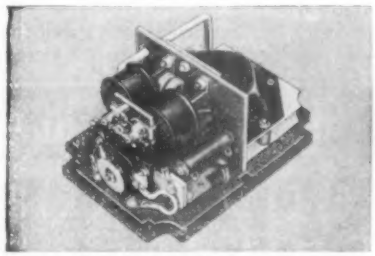
Hartman 120-volt DC relays take the sting out of electrical problems in Northrop Scorpion

Photo: Courtesy Northrop Aircraft, Inc.

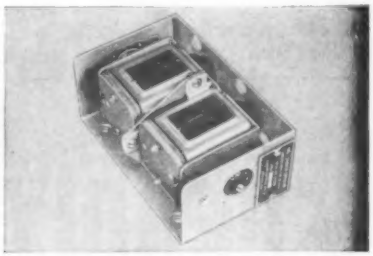
High-voltage electrical systems cut space and weight—all-important considerations in a high-performance aircraft such as the Northrop F-89 Scorpion. But, heretofore, problems in breaking large currents at the higher voltage have prevented use of the more efficient 120-volt DC system.

Solution by Hartman engineers of problems concerning interruping capacity, operation at altitude, welding of contacts and difficulties of control, has resulted in installation of the improved equipment in the Northrop F-89 . . . *the first production airplane to employ a 120-volt DC system.* In addition to seven 120-volt relays of four different types, the F-89 is also equipped with six 28-volt Hartman relays of three different types.

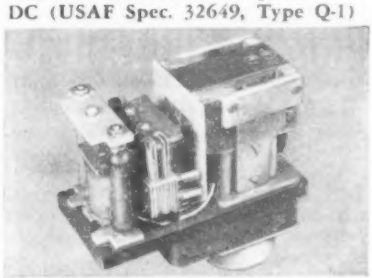
If your problem involves DC controls, turn it over to Hartman where it will be analyzed and engineered with an efficiency that comes from nearly half a century of specialization in DC control equipment. A-5884



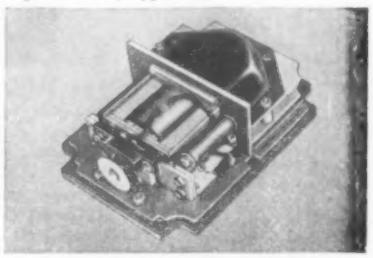
Reverse Current Cutout—250 amp, 120 volts DC (USAF Spec. 32649, Type Q-1)



Overvoltage Relay—120 volts DC (USAF Spec. 32652, Type E-3)

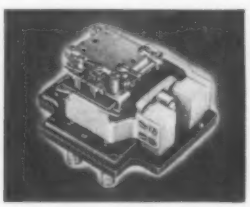


Generator Field Relay—120 volts DC (USAF Spec. 32655, Type M-3)



External Power Relay—250 amp, 120 volts DC (Can break 2500 amps, 120 volts)

Reverse Current Cutout—600 amp, 28 volts (AN3025-2)



Jet Starter Relay—28 volts (AN3391-1)

Overvoltage Relay—28 volts (USAF Spec. 32591, Type E-2)

the Hartman Electrical Mfg. co.

MANSFIELD, OHIO

figuration substantiated all anticipated requirements for drag, lift, stability and control, says Stout. High speed was of the order of Mach 0.95—indicating that level flight transonic performance could be attained with a hydrodynamically proved water-based aircraft designed in accordance with the blended-hull concept.

▶**Delta Plus Blended Hull**—With regard to water-basing of supersonic aircraft, Stout holds that because the major portion of the problems involved lies in the subsonic stages and largely involves integration of a suitable transitory landing device into a basic aerodynamic configuration, there is every reason to suppose that a supersonic solution is merely a matter of time and within the capabilities of current research techniques and facilities.

Studies have been begun to investigate the basic parameters of supersonic water-basing. It has been found that the fundamental hydrodynamic problem is the extension of basic planing theory and impact alleviation to much higher water speeds than previously considered.

While continually lower power loadings will increase the net accelerating force for takeoff, resulting in shorter takeoff distance and time, the actual getaway speeds are going to rise steadily, says Stout, due to increase in wing loading and reduction in maximum lift inherent in these configurations.

In view of Convair's extensive experience with the delta-wing XF-92A and the promise this wing scheme shows, it was natural that this aerodynamic form should be employed in the supersonic research program.

The hydrodynamic configuration offering the least compromise with statics and low speed operation, says Stout, appeared to be the blended hull. And because of the broad experience with form during the Skate project, it was chosen for preliminary studies.

Here again, a dynamic flying model will be used. It incorporates a 60-deg. delta wing. To take care of the increased impact loads due to higher getaway speed, the deadrise has been increased to give the same structural load required for conventional design. With power loadings that will be available, says Stout, high deadrise hulls as in this application hold great promise for successful rough water operation at very high planing speed.

A windtunnel model of the configuration indicates that the desired aerodynamic cleanliness and performance is attainable.

With the research program well into the considerations of supersonic design, Stout contends that it is safe to say that the probability of achieving the original objective is excellent and that it is not too early to give high-speed water-based aircraft serious consideration in strategic planning.

Wave Shaper

Berkshire Laboratories, 598 Lexington Road, Concord, Mass., announces three new Labmarkers, wave-shaping devices for producing time marks in cathode-ray oscillography.

The Labmarker converts a sinusoidal input into a series of sharp unidirectional pulses. These pulses may be displayed directly on the tube face by connecting the Labmarker output to the vertical input of an oscilloscope. Timing marks consisting of breaks in the oscilloscope trace can be obtained by connecting the Labmarker output to the "Z" input terminals.

The unit is self-contained, and may be plugged into the terminals of an oscillator.

Models are available which give pips of either positive, negative or both polarities. Peak amplitude of the output pulse is about one-twentieth of the input voltage, which may be up to 36v. Frequency range covered is from 25 cycles to one megacycle.

HIGHER EFFICIENCY

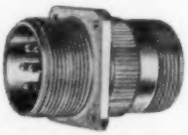
WITH BENDIX SCINFLEX ELECTRICAL CONNECTORS

MINIMUM VOLTAGE DROP

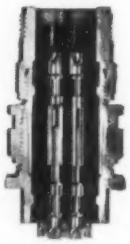
PLUS

- Moisture Proof
- Pressure Tight
- Radio Quiet
- Single-piece Inserts
- Vibration Proof
- Light Weight
- High Insulation Resistance
- Easy Assembly and Disassembly
- Fewer Parts than any other Connector
- No additional solder required

The ability to carry maximum currents with only a minimum voltage drop is an outstanding characteristic of Bendix Scinflex Electrical Connectors. This important feature is only a part of the story of Bendix success in the electrical connector field. The use of Scinflex dielectric material, an exclusive Bendix development of outstanding stability, increases resistance to flash over and creepage. In temperatures from −67°F. to +275°F. performance is remarkable. Dielectric strength is never less than 300 volts per mil. All in all, no other electrical connector combines as many important exclusive features as you will find in Bendix Scinflex connectors. For higher efficiency in your electrical connectors be sure to specify Bendix Scinflex. Our sales department will gladly furnish additional information on request.



PLUS



SHELL
High strength aluminum alloy . . . High resistance to corrosion . . . with surface finish.

CONTACTS
High current capacity . . . Low voltage drop.

SCINFLEX ONE-PIECE INSERT
High dielectric strength . . . High insulation resistance.

Bendix

SCINTILLA MAGNETO DIVISION of SIDNEY, NEW YORK

Bendix AVIATION CORPORATION

FACTORY BRANCH OFFICES:
117 E. Providencia Avenue, Burbank, California • Stephenson Building, 6560 Cass Avenue, Detroit 2, Michigan
Brouwer Building, 176 W. Wisconsin Avenue, Milwaukee, Wisconsin • 582 Market Street, San Francisco 4, California

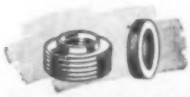
Meet the Hose Clamp Champ that LICKED Vibration

Aero-Seal's famous worm-drive principle set a new standard of hose clamp design—spread from aviation to automotive and wide industrial use. Vibration can't loosen Aero-Seal. And because clamping pressure is uniform all around there is no collapsing or distorting of hose or tube. Uses are legion in aircraft, automotive, marine and industrial products — wherever vibration is a problem and a tight connection the solution. But be sure to get the best — the *original* Breeze Aero-Seal Hose Clamp. Available in ALL STAINLESS STEEL or with STAINLESS BANDS with other components cadmium plated. Manufactured to conform to current ANA specifications.

Lightweight actuators for any requirement.

Flexible conduit and ignition assemblies.

Multiple contact connectors to meet government specifications.



Job engineered, welded-diaphragm bellows.

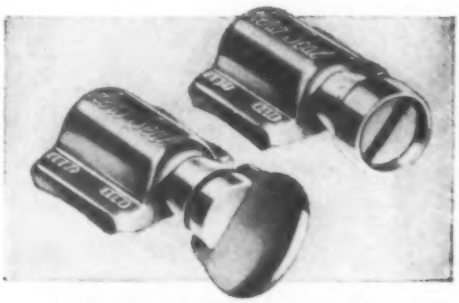
WRITE TODAY for an Aero-Seal sample, outlining your intended use. Prove for yourself that Aero-Seal *is* the hose clamp champ!

BREEZE

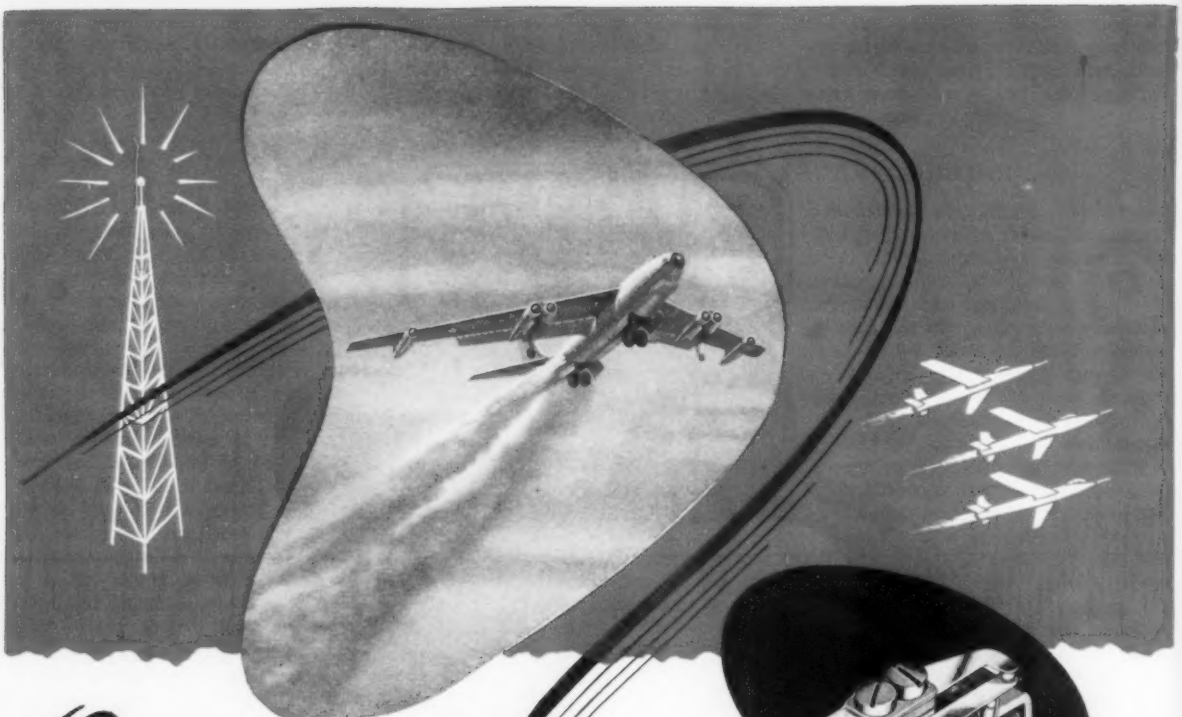
"Aero-Seal" **HOSE CLAMPS**

BREEZE CORPORATIONS, INC.

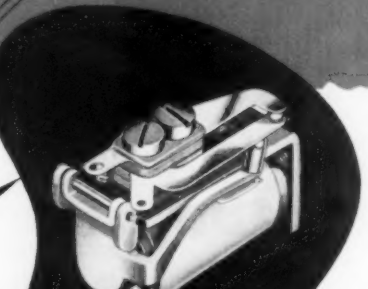
41 South Sixth Street Newark, New Jersey



AERO-SEAL Hose Clamps are available with screwdriver or thumb tab adjustment.



Boeing B-47



SERIES
795 D.C.
TELEPHONE TYPE
RELAY

One OF A LINE...

FOR ARMED FORCES COMMUNICATIONS...

"GUARD-A-SEAL" CONTROLS »»

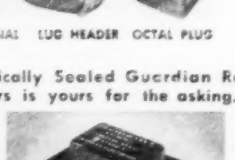
Guardian engineering developments of hermetically sealed containers specifically designed for aircraft.

A. N. CONNECTOR SCREW TERMINAL LUG HEADER OCTAL PLUG

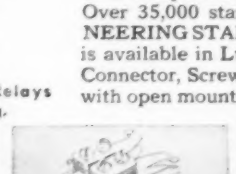
NEW CATALOG on Hermetically Sealed Guardian Relays with various containers is yours for the asking.

In presenting the Series 795 D. C. Telephone Type Relay, Guardian Electric offers to designers of finest precision communications equipment a relay that integrates ideally with every communications circuit... *hermetically sealed* to withstand vibration, impact, heat, cold, moisture, salt air, sand, dust and mold. Name your need —"Guard-A-Seal" relays to fly the mighty B-47 or a tiny subminiature control assembly; jet fighter flight switches or switches for vending control; mechanisms for a giant big-league scoreboard or a compact liquid level control—get them all at GUARDIAN. Over 35,000 standard parts to speed orders—plus a TOP ENGINEERING STAFF to solve "special problems". The Series 795 D. C. is available in Lug Header containers and to specifications in A.N. Connector, Screw Terminal or Octal Plug housings. Also obtainable with open mountings.

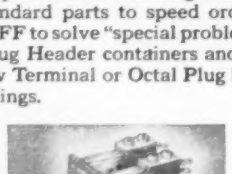
AN-3320-1 D.C.



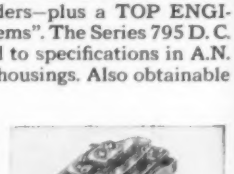
AN-3324-1 D.C.



Series 595 D.C.



Series 610 A.C.—615 D.C.



Series 695 D.C.

ALSO MINIATURE AND SUB-MINIATURE CONTROLS—WRITE

GUARDIAN ELECTRIC

1641-L W. WALNUT STREET CHICAGO 12, ILLINOIS

A COMPLETE LINE OF RELAYS SERVING AMERICAN INDUSTRY

NACA Reports

(NACA Technical Notes are informal papers printed in limited quantities for domestic use only. They are obtainable, free of charge, only by persons having a professional interest in them. Write to Division of Research Information, NACA, 1724 F St., N. W., Washington 25, D. C.)

▶Torsional Strength of Stiffened D-Tubes (TN 2362)—by E. F. Kavanaugh and W. D. Drinkwater.

The purpose of this investigation has been to develop a chart that will permit the estimation of the ultimate torsional strength of stiffened D-sections.

A series of torsional tests was made on stiffened D-tubes of Alclad 24 S-T3 aluminum alloy with a cross section similar to the NACA 0014 airfoil section; the closing web is at 30% of the chord. Stiffeners consisted of ribs and stringers.

An average strength chart has been developed for this type of structure that takes into account the skin thickness, rib spacing and stringer spacing. This chart may also be used for unstiffened D-tubes.

Unit twists and unit strain were measured at a number of points on most of the specimens. Measurement of the unit twist indicated agreement between this type of structure and theory below the buckling point. However the unit-strain measurements could be verified by theoretical analysis only for the strains measured in the webs.

▶Friction at High Sliding Velocities of Oxide Films on Steel Surfaces Boundary-Lubricated with Stearic-Acid Solutions (TN 2366)—by Robert L. Johnson, Marshall B. Peterson and Max A. Swikert.

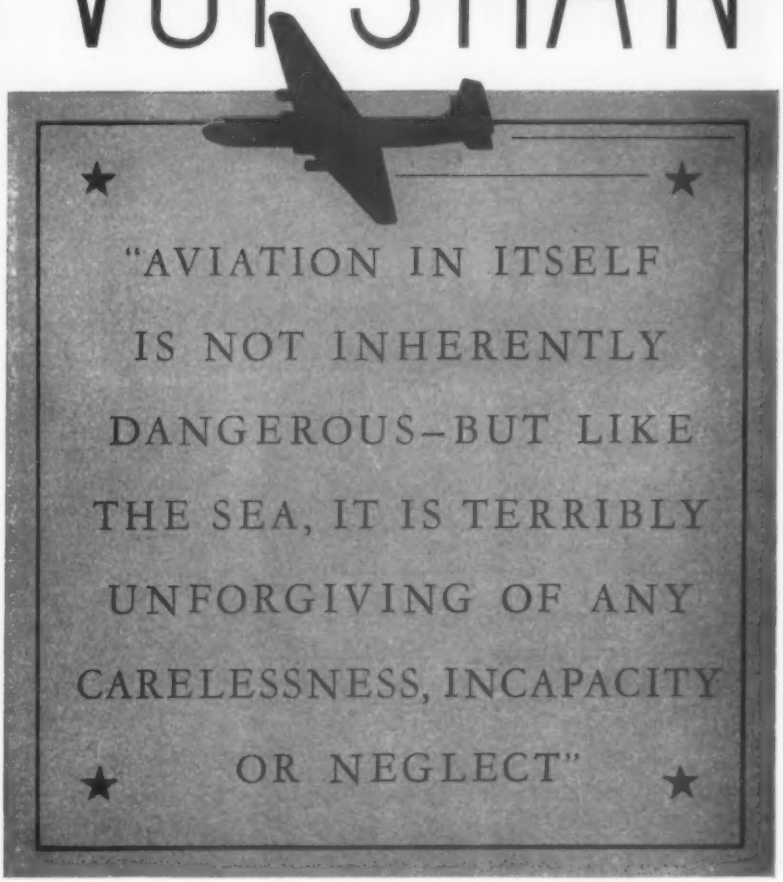
Marginal boundary lubrication has resulted from the use of low-viscosity oils in aircraft engines to allow satisfactory operation at low temperatures.

Use has been considered of lubricant additives to provide increased load capacity of sliding surfaces. The object of the research reported in this note was to investigate a fatty acid (stearic acid) as an additive for the lubrication of steel at high sliding velocities; a further object was to determine the effect of prepared surface oxide films on lubrication by fatty acids.

It was found that lubrication with stearic acid as an additive in cetane was effective at sliding velocities up to 3,000 feet per minute, both for clean steel surfaces and for surfaces coated with ferric oxide.

The experiments indicate that the type of surface oxide and the thickness of the oxide film are important in determining the effectiveness of additive.

VOI-SHAN



With appreciation to *Wright Aeronautical Corporation,* for bringing to our attention these memorable words of C. R. Smith, President of *American Airlines.*

Aircraft Bolts carry a heavy load of responsibility—because they must FLY. VOI-SHAN bolts have a *proved* record of dependability in meeting all requirements of the aircraft industry.

VOI-SHAN MANUFACTURING CO., INC.
8463 HIGUERA STREET, CULVER CITY, CALIFORNIA • PHONE TEXAS 0-4748

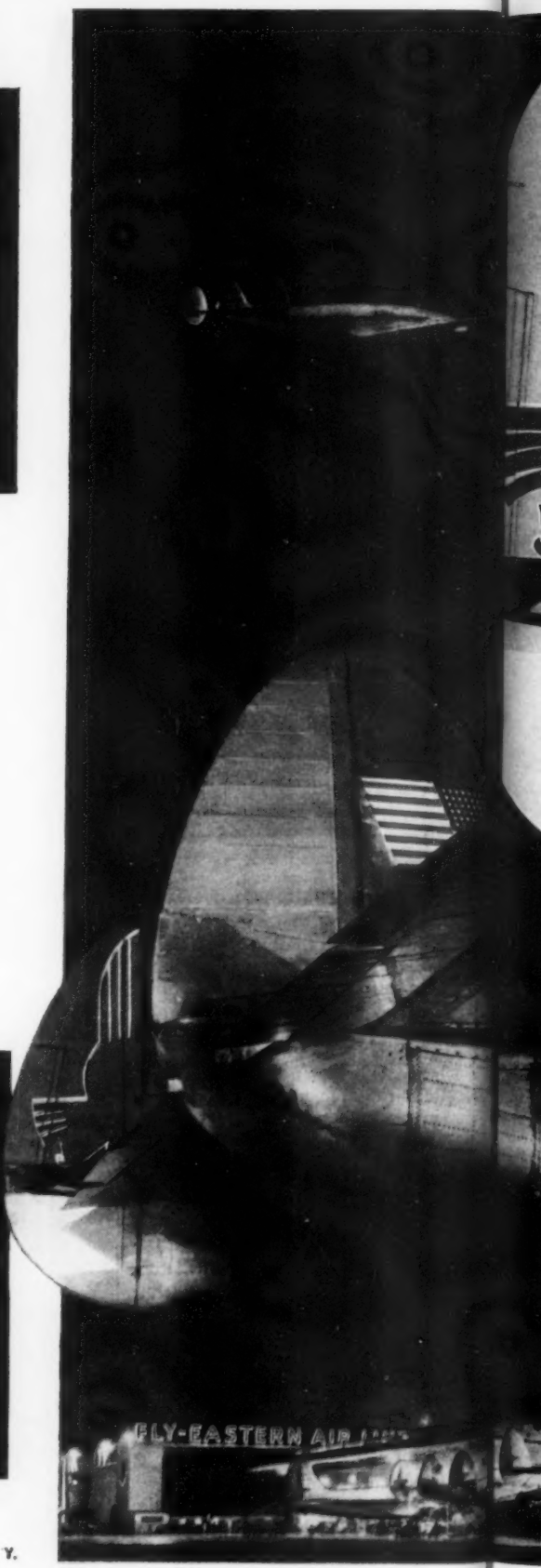
Verified Strength BOLTS FOR
VITAL SECURITY

What's behind Eastern's

DOUBLE DEPENDABILITY

A look behind the scenes at Eastern Air Line's great maintenance base reveals why Eastern lays such stress on "Double Dependability." There, you will find that Eastern takes extra pains, extra steps throughout its overhaul operations, to make doubly sure its planes perform properly.

And Eastern's deep concern for safety applies in its choice of engine lubricants, too. For this critical element, Eastern relies, exclusively, upon Sinclair Aircraft Oil.

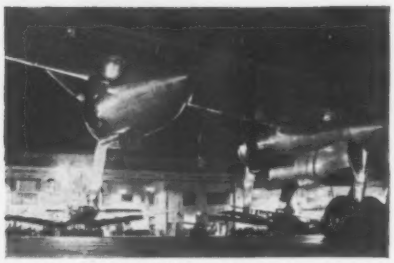


SINCLAIR

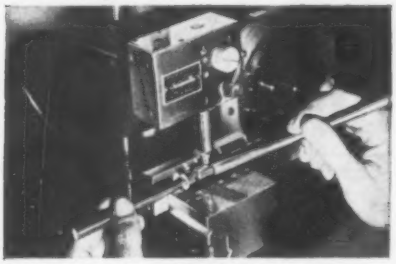
Aircraft Oil for

DOUBLE DEPENDABILITY

AVIATION SALES • 600 FIFTH AVENUE • NEW YORK 20, N. Y.



NIGHT AND DAY—Each of Eastern's planes returns about once a week to the huge maintenance base in Miami for a thorough check-up. Every important part of each plane is checked over carefully.



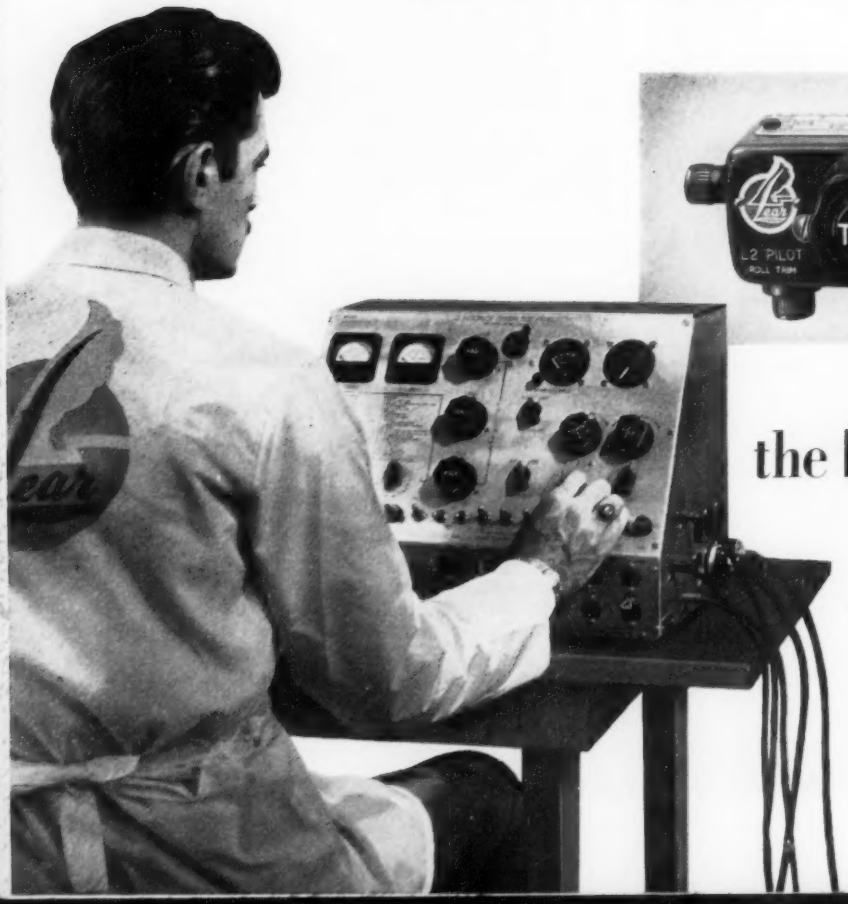
ONLY EASTERN DOES THIS—Here parts of the fuel injector are remeasured by the Electrolimit Gauge. Parts must fit with tolerances between 90 and 110 millionths of an inch!

500 MAN-HOURS are spent on each major engine overhaul—many more hours than standard requirements. This is part of Eastern's Double Dependability.

DOUBLY DEPENDABLE LUBRICATION—Eastern demands reliability in its lubrication, too. Only Sinclair Aircraft Oil is used, for less wear, less heat and lowered maintenance costs.

55 cities

throughout the United States now have more than 85 Lear factory-trained, factory-approved specialists permanently available for the installation and service of Lear L-2 Autopilots. These men have been thoroughly schooled at the Lear factory by the *designers* of the L-2 Autopilot in every aspect of its operation and maintenance. You can now purchase a Lear L-2 Autopilot —described by airmen as "the greatest contribution to flying since the invention of the airplane itself"—with the assurance of getting factory-level attention in your own home town, or no more than forty-five minutes' flying time from it. Write today for a free illustrated copy of the L-2 information manual and the name and address of your nearest factory-authorized L-2 Autopilot service station. Lear Incorporated, 11916 West Pico Boulevard, Los Angeles 64, California.



the LEAR autopilot L2

4-0-4 SCHEDULE calls for delivery of 40 planes to TWA by June, 1952.

TWA Bustling With 4-0-4 Plans

Experience with 2-0-2 easing way for debut of larger Martin craft; first delivery due late this month.

By George L. Christian

Kansas City, Mo.—Trans World Airlines likes its Martin 2-0-2As and looks forward to the arrival of its fleet of larger and improved Martin 4-0-4s.

The 2-0-2A is popular with TWA's engineering executives, Robert W. Rummel, the airline's chief engineer, and Raymond M. Dunn, director of engineering and maintenance.

Rummel told AVIATION WEEK that the 2-0-2A was introduced into scheduled service with fewer delays and mechanical problems than any other new aircraft in TWA's experience—and that includes the Douglas DC-1, DC-2, DC-3, Boeing Stratoliner and Lockheed Constellation. For example, in the first month of operation, the 2-0-2A had only 18 malfunctions per 1,000 flying hours whereas on another new type of airplane introduced several years ago, TWA had 24 malfunctions per 1,000 hours.

In fact, during the early period of Martin operation, TWA flew more block hours per delay with the 2-0-2A than it did with some of its four-engine equipment.

▶**'Bug' Treatment**—As would be expected, after the airplane accumulated flying hours, some "bugs" did develop. During the winter the malfunctions increased. But these bugs have responded well to corrective action, as evidenced by marked decrease in current troubles. TWA asserts that the 2-0-2A's engines have been remarkably free from problems, ranging from minor difficulties to engine failures.

Both Rummel and Dunn are hopeful that the 4-0-4 will be even easier to introduce since the airline's flight and ground personnel will have had more than a year's experience with its predecessor on which to build a smooth debut for the larger, pressurized aircraft.

First of the 4-0-4s is scheduled for delivery during the latter part of this month. By the end of the next month, two additional aircraft will have been added. Deliveries are laid out so that by the end of the year TWA should have received 12 of this model. By June, 1952, the entire fleet of 40 Martin 4-0-4s will have been delivered, Rummel said.

▶**Getting Ready**—TWA is busy preparing for the 4-0-4's arrival. This preparation has been under way since spring, 1950, when the 2-0-2A introduction program was launched.

Introduction of the 4-0-4 into TWA's domestic service should be expedited considerably because much of the planning for it overlapped planning for the 2-0-2A. This two-in-one scheme should prove a money saver, Rummel said.

The first two 4-0-4s received will be assigned to pilot training. Crews already checked out on the 2-0-2A will be given intensive ground training to familiarize themselves with the many differences in the two aircraft. They will also receive transition flying.

Pilots not having experience on the 2-0-2A will be given specialized ground training and flight transition time until they are completely familiar with the plane. The actual amount of training given to 2-0-2A captains will depend largely on how similar the two planes are. TWA expects it will take seven months to check out the necessary crews for the whole fleet of 4-0-4s.

Ground school instructors already have been sent to the Martin plant to be trained on the 4-0-4 and a training course has been set up at the airline's main base here for flight personnel. Instructor flight crews will be trained at the Martin plant. They in turn will check out additional flight instructors to form the cadre of TWA's 4-0-4 check pilots.

▶**Route Familiarization**—Before flight crews take the plane into commercial service, they will be given 25 hours of route familiarization over the airline's skyways and air ports.

Virtually every department of TWA is currently working on some phase of the 4-0-4's debut. Rummel is serving as coordinator in integrating the plane into the airline's schedule and route pattern.

One of the planes, with a corps of instructor personnel, will visit each line station to permit mechanics and ground personnel to become thoroughly familiar with their respective duties on the aircraft.

Dunn, TWA's maintenance and engineering director, has set up detailed maintenance training for the plane, including allocation of one 4-0-4 for mechanics at the overhaul base.

Because of all this training, the planes will have flown many hundreds of hours before the traveling public sets foot in one.

From a traffic standpoint, TWA anticipates that the many refinements for increased passenger comfort will attract new business, and please regular customers as well, especially in those cities where 4-0-4s will replace DC-3s currently in service.

TWA already has found that passengers like the 2-0-2A's tail loading ramp and the advantages of carry-on baggage. TWA's 2-0-2As currently are flown only between Kansas City and New York with intermediate stops. The 4-0-4s will be flown from coast to coast, with stops en route.

The airline now has 65 Constellations flying from San Francisco as far as Bombay, India. Ten Super Constellations are scheduled for delivery next year. The 2-0-2As now under lease from Martin will be returned as soon as the 4-0-4 deliveries have been completed next summer.

PanAm Standardizes Stratocruiser Props

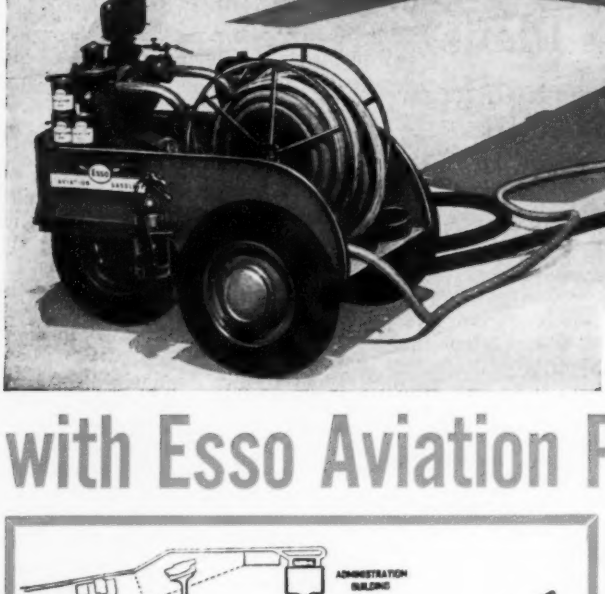
Propellers on Pan American World Airways Pacific-Alaska division Boeing Stratocruisers will soon be changed from Curtiss Electric to Hamilton Standard.

Principle reason for the swap from the round tip to square tip props, ac-

Williamsport's modern municipal airport provides prompt, dependable service...

Mr. J. Robert Bazley, veteran private flyer, talks with Fred Kennie, airport manager, while his plane is serviced through Esso hydrant system.

with Esso Aviation Products...



THE WILLIAMSPORT, PENNSYLVANIA, MUNICIPAL AIRPORT

Located four miles from the city this modern airport is served by three major airline networks TWA, Capitol, and All American. There are complete servicing facilities and a flight school. The field also has two approved repair stations.

Covering 227 acres this airport has an elevation of 529 feet above sea level. There are two lighted, concrete runways 4320 and 4060 feet in length with two additional black-top runways of 3520 and 2130 feet. The field is lighted.

The new Administration Building has 15000 feet of floor space and houses airline passenger, airmail, freight and express facilities, and a complete restaurant. The Interstate Airway Communications (call letters IPT) and the United States Weather Bureau also maintain stations in this building.

Mr. Bazley, pictured above at the new Williamsport Administration Building, has been an Esso user for nearly 20 years. In addition to having his plane serviced with Esso Aviation Products, Mr. Bazley, as one of the country's largest anthracite stripping and highway contractors, uses Esso Products exclusively for his trucks and other machinery. In the skyway or on the highway, Mr. Bazley knows he can depend on the products that carry the Esso trade-mark.

ESSO AVIATION PRODUCTS offer high quality, backed by the constant research of America's largest petroleum laboratory. Servicing one private plane or a whole fleet of commercial airliners... the products sold at the famous Esso Sign help maintain highest operating efficiency... keep 'em flying!

Esso

AVIATION PRODUCTS

SOLD IN: Maine, N. H., Vt., Mass., R. I., Conn., N. Y., N. J., Penna., Ohio, Del., Md., D. C., Va., W. Va., Ky., N. C., S. C., Ga., Fla., Ala., Miss., Tenn., Ark., La., Texas.

cording to PanAm, is a total pay load increase of 3,950 lb. per plane. Take-off weight jumps from 142,500 lb. to 145,800 lb. because of the new propeller, while another 650 lb. is gained because the Ham Standard installation is that much lighter than the Curtiss.

Speed performance has been debated, but PAA engineers expect a slight increase at cruising speed. Another benefit resulting from the change-over will be complete standardization; the division is now using both types of propellers.

Schedule calls for four props to be changed in October and three every month thereafter.

NWA Adopts Analyzer For Stratocruisers

Northwest Airlines is the latest U.S. carrier to adopt the engine analyzer as standard equipment (AVIATION WEEK, Apr. 2, p. 34). The airline is installing the Sperry airborne instrument on its fleet of 10 Boeing Stratocruisers.

Decision to make the installation was taken after a single test unit was installed in a Stratocruiser for one year. The test aircraft rang up these impressive figures:

- Delays due to ignition difficulties reduced by an average of 28.1%.
- Flight cancelations down 35.4%.
- Spark plug changes cut by 16.8%.

With such performance on the entire fleet, Northwest engineers believe they will get back the $72,000 analyzer bill in 9½ months through maintenance savings. Once the installation cost of the analyzers has been amortized, the airline counts on an annual saving of $65,000.

Don O. Benson, NWA's manager of engineering, pointed out that because the Stratocruiser's 3,500-hp. engines each have 28 cylinders, seven magnetos and 56 spark plugs, it might be necessary to examine individually as many as 91 separate components in order to locate a minor engine malfunction. Much of this work will be eliminated by installation of the Sperry analyzer.

Moreover, NWA quotes CAA records as showing that from 20% to 50% of schedule flight delays are due to engine and engine accessory troubles; that 50% of these engine malfunctions are due to ignition difficulties, while a large portion of the remaining troubles are caused by mechanical components such as valves. Many of these types of malfunctions NWA says, will be caught by the analyzer, either on the ground or in flight, while still incipient.

NWA flight engineers, maintenance men and other interested personnel will be given an extensive training course in the use of the instrument.

MN-85 — Fly OMNI-RANGE with the world-famous Bendix NA-3 Navigation System of which the MN-85D receiver is the heart. Precision built to military standards, the MN-85D is a truly fine — ultra sensitive — extremely stable crystal controlled superheterodyne receiver. Used in conjunction with the Bendix OMNI-MAG indicator you can enjoy "picture window" flying in any weather.

TA-18 — For clear, reliable communication every time, the new Bendix TA-18 airborne V. H. F. transmitter is the answer. Just select any of 180 V. H. F. channels with a dial calibrated directly in megacycles. No special skill is required to set the TA-18 on the nose, no dial twisting, no rocking back and forth — just set it on the desired channel and you will be "loud and clear" regularly. A full 25 watts of R. F. Power is available, crystal controlled on every channel.

Write now for detailed technical information on the Bendix TA-13 transmitter and NA-3 navigation system, a perfect pair for the latest and the best in V. H. F. communications and navigation.

Whatever the Plane or Purpose . . .

Bendix Radio is the Choice

BENDIX RADIO DIVISION of Bendix AVIATION CORPORATION
BALTIMORE 4, MARYLAND

Export Sales: Bendix International Division, 72 Fifth Avenue, New York 11, New York
Canadian Distributor: Radio Engineering Products, Ltd., 4305 Iberville Street, Montreal, Quebec

FLIGHTMETAL *Imagineering*

forge-tapers a one-piece wing spar

Ordinarily, a tapered aluminum wing spar is made with two long machine-tapered, T-shaped extrusions. Takes about 50 major parts, a lot of rivets, many separate operations.

At McDonnell Aircraft, a production executive wondered... why not make a one-piece spar from an I-beam extrusion tapered by the forging process? He talked it over with Alcoa engineers... and now... McDonnell has built them into experimental aircraft.

The new spar is an Alcoa 75S-T6 extrusion with a bulb of metal in the web. Forging flattens the bulb progressively, so that the 13-foot spar finally tapers from 15½ to 10 inches deep. Besides simplifying production, the one-piece spar is *50 pounds lighter* than the former design.

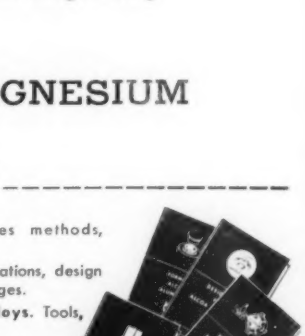
If you have a problem involving aluminum or magnesium, we'd welcome an opportunity to pool our facilities and know-how with yours in the interests of *Flightmetal Imagineering.*

ALCOA ALUMINUM MAGNESIUM

Ask ALCOA for the Flightmetal Training Aids you need

Alcoa's complete library of design and fabricating information is available now to help you train employees—add to your own know-how. Your nearby Alcoa sales office will supply books free, lend you films. Or check what you need on this coupon and mail to ALUMINUM COMPANY OF AMERICA, 1800K Gulf Building, Pittsburgh 19, Pennsylvania.

- ☐ **Forming Alcoa Aluminum.** Describes methods, alloy characteristics. 65 pages.
- ☐ **Designing for Alcoa Die Castings.** Applications, design practice, alloys, production, finishing. 188 pages.
- ☐ **Machining Alcoa Aluminum and Its Alloys.** Tools, methods, speeds, feeds. 68 pages.
- ☐ **Welding and Brazing Alcoa Aluminum.** Shop manual on all techniques. 137 pages.
- ☐ **Alcoa Aluminum and Its Alloys.** Properties, tolerances, sizes. 178 pages.
- ☐ **Designing for Alcoa Forgings.** Covers types of forgings, applications, alloys, design and production details. 171 pages.
- ☐ **Sound Films (16 mm).** _____ (Type of fabrication.)



USAF CONTRACTS

Following is a list of recent USAF contracts announced by Air Materiel Command:

Aero Supply Mfg. Co., Inc., Corry, Pa., aircraft bolts, Cl. 04A, 2,089,000 ea., $45,910.

Ajax Manufacturing Co., Cleveland, presses, over $250,000.

Bell & Howell Co., Chicago, cameras, Cl. 10B, 119 ea., $149,616.

Industrial Tape Corp., New Brunswick, N. J., tape, pressure sensitive, Cl. 25B, 68,300 rolls, $91,195.

Lumoar Mfg. Corp., New Haven, container assemblies, Cl. 20, 20,000 ea., $219,200.

McColpin-Christie Corp., Los Angeles, rectifiers, Cl. 17A, 21 ea., $38,939.

Minnesota Mining & Mfg. Co., St. Paul, scotch tape, Cl. 25B, 63,830 rolls, $47,489.

Standard Pressed Steel Co., Jenkintown, Pa., wrenching steel bolts, Cl. 04A, 55,500 ea., $28,324.

U. S. Gauge div., American Machine & Metals, Inc., Sellersville, Pa., transmitters, fuel pressure synchro style, Cl. 05D, over $250,000; transmitters, oil pressure, Cl. 05D, 1,443 ea., $155,861.

Air Research Mfg. Co., div. of Garrett Corp., Los Angeles, research & development on heat exchangers, eng. data & reports, 1 ea., $145,586.

Bendix Aviation Corp., Bendix Products div., South Bend, wheel assembly 756 ea., brake assembly & spare parts, Cl. 03B, 731 ea., $170,007.

Boeing Airplane Co., Seattle div., Seattle, kits for frequency meter installation, 88 ea., kits for installation of wing illumination lights, 10 ea., Cl. 01F, $65,414.

Crane Co., Dayton, air valves, 1 job, $68,641.

General Electric Co., Schenectady, single phase power transformer, 1 job, $71,951.

E. A. Kinney Co., Cincinnati, borer-jig, metal, single verticle spindle type, Cl. 17A, 6 ea., $106,010.

Lamar Aero Supply Corp., Clinton, Okla., overhaul, modification & winterization of type B-3 driftmeters, Cl. 05A, $124,800.

McColpin-Christie Corp., Los Angeles, rectifiers, 75 ea., 1000 Amp for jet engine starting, 6 ea., Cl. 17F, $165,247.

North American Aviation, Inc., Los Angeles, engineering changes on F-86E aircraft, over $250,000.

Pittsburgh-Des Moines Steel Company, Pittsburgh, furnish & install air heater, over $250,000.

Pratt & Whitney div., Niles-Bement-Pond Co., West Hartford, boring machines, Cl. 17A, over $250,000.

Refinite Corp., Refinite Sales Co., div., Omaha, type A-1, demineralizers, spares and data, Cl. 19A, over $250,000.

Robbins & Myers Inc., Springfield, O., hoist-electric cable, 100 ea., $121,100.

Standard Electrical Products, Dayton, transformer type 3, class 3, Cl. 08D 100 ea., $42,501.

Stanford Research Institute, Stanford, Calif., eng. services in the form of study, analysis & investigation of an Airborne Homing Group, AN/ARA, 1 lot, $55,132.

U. S. Gauge div., American Machine & Metals, Inc., Sellersville, Pa., transmitters, type D-6, Cl. 05D, 243 ea., $31,373; indicator, oil pressure, Cl. 05D, 2,884 ea., $213,931; indicator oil pressure type MS 28010-3, Cl. 05D, 1,955 ea., $142,919; transmitter oil pressure type MS 28005-2, Cl. 05D, over $250,000.

Air Speed Tool Co., Los Angeles, pneumatic drills, Cl. 17A, 6,108 ea., $246,480.

American Airmotive Corp., Miami Springs, V-1650-7 Packard Merlin engine parts, major parts and assemblies, Cl. 02J, over $250,000.

American LaFrance Foamite Corp., Elmira, type O-11A, 1000 gal. crash fire truck & spare parts, Cl. 19B, over $250,000.

American Welding & Mfg. Co., Warren, O., machinery and equipment for use in

Standard-Thomson

dependable lighting

for cabins and cockpits

Vaporproof cabin lamp

Cockpit lamp assembly

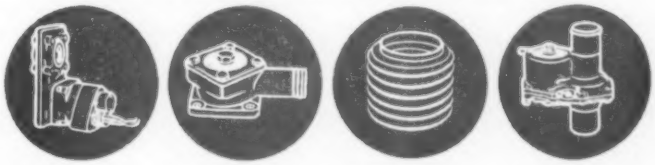
CABIN LAMPS: These all-metal cabin dome lights are proof against vapor or moisture at any altitude. Regardless of atmospheric conditions, they assure clear, brilliant light. Weight: 1 lb., 10 oz. Diameter: 5⅞"; length: 6⅞". For complete information, write:

COCKPIT LAMPS: A sturdy source of dependable auxiliary light for all types of aircraft. Made to USAF specifications with chainlock filter and retractable cord. 13 or 28 volt bulb and rheostat. Weight: 11 oz.; length: 5⅛"; diameter: 1¾". Also available with straight cord.

STANDARD-THOMSON CORPORATION • DAYTON 2, OHIO

Standard-Thomson

Makers of USAF-approved bellows • valves • lights



Shut-off Valves | Barometric Pressure Valves | Tech-Forge Flexible Couplings | Crankcase Pressurizing Valve

Clifford Feather Weights Cool the Oil in

Chance Vought's Cutlass Fighters

POWERFUL TWIN JETS. Vought's Cutlass Fighters represent the latest advances in high speed aircraft design. Stubby, sweptback wings permit tremendous speeds, twin afterburners help develop additional thrust. This great addition to Uncle Sam's air fighting forces carries Clifford Feather Weight All-Aluminum Oil Coolers.

All types of modern aircraft rely on Clifford Feather Weights for oil cooling. They are *the only all-brazed type of oil cooler*. Their superior weight-strength ratio is a result of Clifford's patented brazing method and accurate pre-testing in Clifford's wind tunnel laboratory . . . largest and most modern in the aeronautical heat exchanger industry. For full details on Clifford Feather Weight All-Aluminum Oil Coolers, write CLIFFORD MANUFACTURING COMPANY, 136 Grove St., Waltham 54, Massachusetts. *Division of Standard-Thomson Corporation.* Sales offices in New York, Detroit, Chicago, Los Angeles.

CLIFFORD

HYDRON

ALL-ALUMINUM OIL COOLERS
FOR AIRCRAFT ENGINES

HYDRAULICALLY-FORMED BELLOWS
AND BELLOWS ASSEMBLIES

production of J-47 engine components, over $250,000.

Anderson Air Activities, Milwaukee, operation of Malden, Mo., for conducting basic flying training, over $250,000.

Associated Co., Inc., Wichita, screw tow target cable stop, 80 ea., support assembly, cable pulley, 40 ea., weight flag tow target, 14,000 ea., lead assembly, tow target, Cl. 28B, 26,350 ea., $79,917.

Atlas Hardware Co., New York, drill, twist, Cl. 17A, 63,381 ea., $61,120.

Aviation Engineering Corp., Woodside, L. I., indicator, temperature, type B-18, Cl. 05D, 228 ea., $31,787.

Beech Aircraft Corp., Wichita, wing tanks for jet aircraft, 27 ea., $45,599; facilities for production of T-33A and F-94 wing sets and B-47 ailerons, over $250,000; wing tanks for jet aircraft, 20 ea., $45,599.

Bendix Aviation Corp., Bendix Products div., South Bend, Indiana, wheel assembly, brake assembly, spare parts, Cl. 03B, 237 ea., 229 ea., $49,550.

Bendix Aviation Corp., Bendix Radio div., Baltimore, facilities for production of AF-FPS-3 & AN/CPN-18 radar sets, over $250,000.

Bjorksten Research Laboratories, Madison, improvement of plastic laminates, $69,433.

Bryant Machinery & Engineering Co., Chicago, high speed drilling machines, Cl. 17A, 15 ea., $71,850.

Buda Co., Harvey, Ill., Buda LO 525 engines, spare parts & data, Cl. 19B, 50 ea., $89,000.

Canadian Commercial Corp., Washington, D. C., procurement of 40T-36A, twin-engine pilot trainers, over $250,000.

Cincinnati Milling & Grinding Machines, Inc., Cincinnati, centerless grinders, tool cutter grinders, 3 ea., 1 ea., $39,499; milling machines, grinding & sharpening machines, Cl. 17A, over $250,000.

Cleveland Automatic Machine Co., Cincinnati, machine screw, Cl. 17A, 2 ea., $43,320.

Consolidated Vultee Aircraft Corp., San Diego, services & materials necessary to accomplish reconditioning and modification of B-36 airplanes, over $250,000.

Continental Drill Corp., Chicago, drill, twist, Cl. 17A, 462,650 ea., $97,416.

Continental Motors Corp., Muskegon, Mich., PC 30-1 engines, spare parts & data, Cl. 19B, over $250,000; PE 200-2 engines, spare parts & data, Cl. 19B, over $250,000; facilities for the production of 0-470-11 and packette aircraft engines, over $250,000; PC-60-2 engines, spare parts and data, Cl. 19B, over $250,000; PE-90-2 engines, spare parts & data, Cl. 19B, over $250,000.

Crawford Door Co., Detroit, facilities, $250,000.

Darr Aero Tech., Inc., Chicago, operation of Marana Field, Marana, Ariz., for conducting basic flying training, over $250,000.

Dayton Precision Mfg. Co., Dayton, facilities for production of electric motor commutators, $200,000.

Denison Engineering Co., Columbus, hydraulic test stand type D-2, spare parts, Cl. 17C, 30 ea., 1 lot, $178,245.

Eaton Mfg. Co., Cleveland, machinery & equipment for the production of J-47 turbine blades, Cl., $110,000.

Erie Foundry Co., Erie, drop hammers, Cl. 17A, over $250,000.

General Electric Co., Schenectady, services to repair & modify B-36 fire control systems, $200,000; indicator, position, landing gear, Cl. 05G, 4,016 ea., $84,837; modification kits for B-36 fire control systems, $86,503.

General Motors Corp., Lockport, N. Y., Harrison Radiator div., facilities for production of coolers, $200,000.

Gerity-Michigan Mfg. Co., Adrian, Mich., facilities for the production of magnesium castings, $225,000.

Gilfillan Bros., Inc., Los Angeles, radar sets AN/CPN-4, Cl. 16C, over $250,000.

Goodyear Tire & Rubber Co., Inc., Akron, wheel assemblies, 408 ea., brake assemblies, Cl. 03B, 347 ea., $62,243; wheel assembly, 295 ea., brake assembly 295 ea., spare parts, Cl. 03B, 7 ea., $30,732.

Greenleaf Mfg. Co., St. Louis, indicator, airspeed, type F-5, Cl. 05C, 140 ea., $50,000.

Hardinge Bros., Inc., Elmira, N. Y., milling machines, bench type, 5 ea., milling machines horizontal, Cl. 17A, 10 ea., $61,316.

Indiana Gear Works, Inc., Indianapolis, machinery and equipment for production of Sikorsky helicopter components, over $250,000.

Lavoie Lab., Inc., Morganville, N. J., radio set AN/GRC-30, Cl. 16B, over $250,000.

Lieb-Jackson, Columbus, Ohio, installing test facility, $50,000.

Linde Air Products Co., div., of Union Carbide & Carbon Corp., Tonowanda, N. Y., pumps and data, liquid nitrogen storage tanks, 1 ea., Cl. 19A, 72,000.

Link Aviation Inc., Binghamton, trainer-flexible gunnery, remote control, classroom, basic type E-26, Cl. 28B, over $250,000.

Lockheed Aircraft Service, Inc., Long Island, cycle maintenance of C-121 type aircraft, Cl. 01, over $250,000.

Marmon-Herrington Co., Inc., Indianapolis, type 10 600-gal, crash fire trucks & spare parts for above units, Cl. 19B, over $250,000.

Mast Development Co., Davenport, Iowa, dot-counters, photographic, interpreters, type A-1, Cl. 10B, 5,000 ea., $163,349.

Master Electric Co., Dayton, 500 amp DC generators, spare parts & data, over $250,000.

Minneapolis-Honeywell Regulator Co., Minneapolis, type F-5 automatic pilot components used in F-96 and F-84E airplanes, Cl. 05F, over $250,000.

Motch & Merryweather Machinery Co., Cincinnati, vertical turret lathes, Cl. 17A, over $250,000.

National Die Casting, Chicago, accelerometer, aircraft, three pointer, type B-6, Cl. 05C, 1,050 ea., $100,000.

National Pneumatic Co., Holtzer-Cabot div., Boston, inverters, spare parts & data, Cl. 03C, over $250,000.

New York Twist Drill Co., New York, drills twist, straight shank, Cl. 17A, 140,434 ea., $31,099.

Pfaff & Kendall, Newark, N. J., masts AB-158/GR, Cl. 16B, 914 ea., $89,508.

Radio Corp. of America, Camden, N. J., acceleration, 16A, 70,616.

Incomparable

a pretty girl

Ample inspiration to make the lowliest of dubs a goal-crossing All American, Cynthia Hood is something of an athlete in her own right. She is an expert swimmer and is majoring in physical education at SMU. Cynthia is 19, has blue eyes and brown hair. (No. 1 in a series of pretty Dallas girls discovered and photographed for Southwest Airmotive).

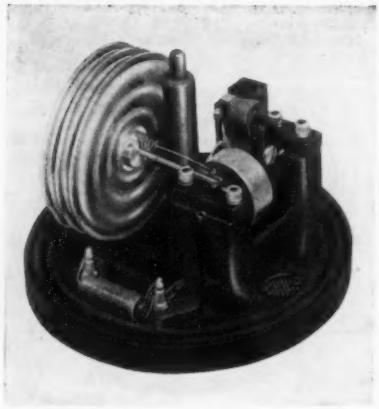
Incomparable

A Gyro overhaul by Southwest Airmotive.

SOUTHWEST AIRMOTIVE COMPANY

LOVE FIELD • DALLAS

NEW AVIATION PRODUCTS



Autopilot Control

An automatic altitude control, accurate to ±50 ft. and designed for use with the L-2 and other autopilots, has been placed on the market by Lear, Inc.

The control, in conjunction with the autopilot, maintains the plane at a constant barometric pressure altitude through an effective operating range of 1,000 ft. above sea level to 20,000 ft. above.

The device is simply constructed, Lear stresses. It has no gear trains, employing instead a pressure sensitive bellows, an electromagnetic disconnect clutch and an electrical "EI" pick-off differential transformer.

A switch is closed to energize the electromagnetic clutch. This clutches the sensitive bellows to the electrical EI pick-off.

Main function of the bellows is to supply linear motion with any linear change in altitude. Expansion or contraction of the bellows, caused by change in altitude, rotates the clutch disc which transmits this motion to the clutch housing, then to a torsion shaft which rotates the "I" of the EI pick-off, inducing an unbalanced signal voltage in the pick-off coils. The signal voltage is fed as input to the elevator channel of the autopilot amplifier, which analizes the signal and creates an output for the elevator servo.

The control is available for 12 and 24v. systems. It is housed in a cylinder 3.78 in. in diameter, 2.75 in. high and weighs 1.1 lb., less shockmount.

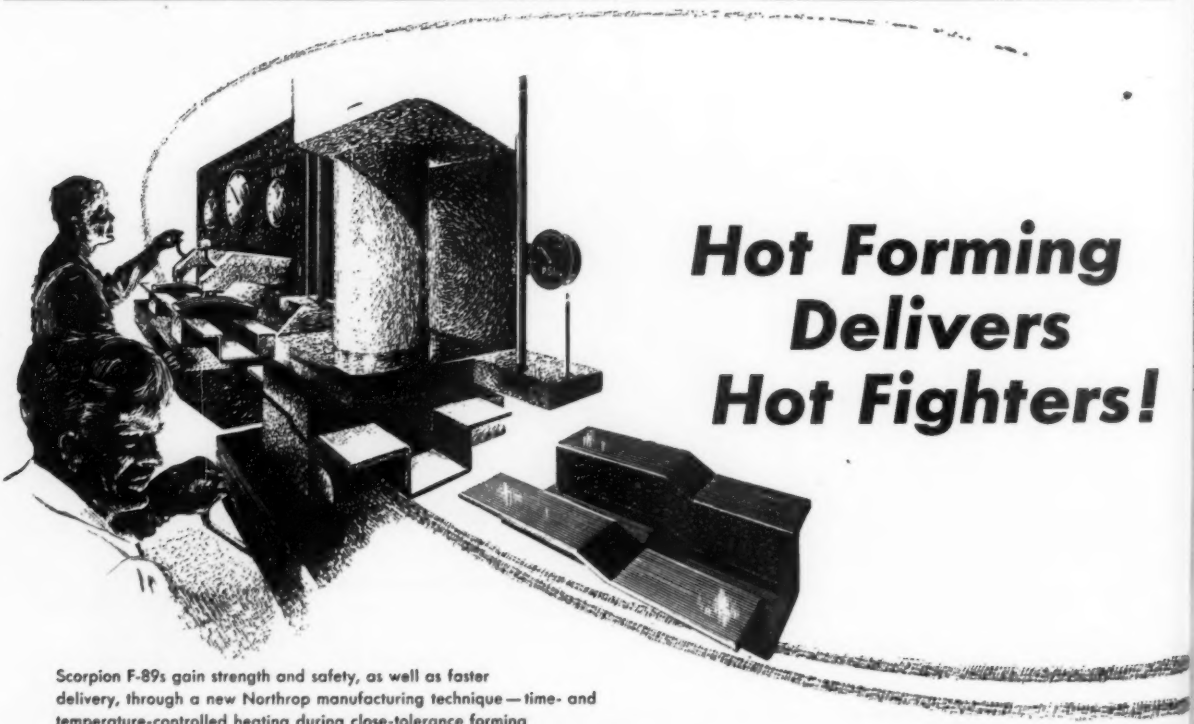
Lear, Inc., 11916 W., Pico Blvd., Los Angeles 64.

Metal-Nylon Bearing

Proving there's more than one way to skin a cat, Thomson Industries, Inc., has developed a new Nylon bearing which utilizes the advantages offered by this material as a bearing surface, but avoids its shortcomings.

Called the "Nylined" bearing, it is expected by the firm to extend the use of Nylon as a bearing material into many aviation and other applications previously found unsuitable. Unlike plain injection-molded or machined Nylon bearings, the part consists of an outer sleeve of inexpensive metal and a thin lining of Nylon (du Pont's FM 10001) bearing material.

The new bearing permits closer fits, more uniform load distribution assuring greater load capacity and life, says



Scorpion F-89s gain strength and safety, as well as faster delivery, through a new Northrop manufacturing technique—time- and temperature-controlled heating during close-tolerance forming of thick-section alloy extrusions. • Manufacturing resourcefulness at Northrop saves thousands of man-hours per month. The result is consistently high records in producing Northrop F-89 Scorpions . . . fast, heavily-armed, electronic search equipped . . . deadly modern counterparts of World War II P-61 Black Widows; and the new standard all-weather interceptors of the U. S. Air Force.

NORTHROP
Pioneer

Thomson. Wide clearances necessary in the usual Nylon bearing to compensate for dimensional changes are eliminated. They are taken up by a compensation gap in the liner with no appreciable effect on the diameter of the bearing.

Thomson Industries, Inc., Manhasset, L. I., N. Y.

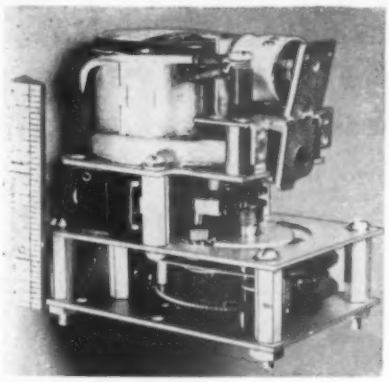
Airborne Case Valve

A case of adding a little weight to subtract a bigger weight is seen in a new valve for containers protecting airborne components.

The valve, Aveco Series 1081, acts as an emergency one-way vent. It permits quick entry of atmospheric air pressure if internal pressure in the container is so low (from extended high-altitude flight) as to cause it to collapse during rapid descent of the aircraft. The valve can be used with cases which must be watertight and do not admit air fast enough to equalize the internal pressure with the suddenly increased atmospheric pressure on the outside.

Since excessive pressure differentials of this type are eliminated by the valve, the container does not have to be "beefed up" to withstand them and can be constructed of lighter materials than usual, the maker explains. Also, the valve provides a means of venting the case so the cover can be removed.

Associated Valve and Engineering Co., 1150 W. Marquette Rd., Chicago 21.



Tube Protector

Production of a "delayed reset time delay relay," designed to protect vacuum tubes under rugged operating conditions in military aircraft has been started at the A. W. Haydon Co.

The unit "assures the desired delay in feeding high voltage to the plate circuit, holding back the load until the cathodes have reached proper temperature," explain Haydon engineers. Also, in event of a power interruption, it opens the circuit.

Specifically, the relay makes possible a delayed reset proportional to the time delay and a circuit reclosure time proportional to the length of current interruption. An example is a radar installation in which a 15-min. delay is provided prior to closure of the load circuit. The time required for the unit to reset is 7 min. When a current interruption less than 7 min. duration occurs, the time delay before reclosure is proportional to the length of current interruption. In other words, a 5-min. interruption, for example, would require only 5 min. before circuit reclosure—eliminating needless "down time" for the radar set.

A. W. Haydon Co., 232 N. Elm St., Waterbury, Conn.

Space-Saving Motors

Low inertia servo motors, emphasizing space- and weight-saving features, are being produced in several models by Ford Instrument Co.

The motors eliminate the need for transformers. This is achieved by building them with high voltage control windings, says Ford. They also have close-coupled windings for feed back purposes. Motors are available in ½-, 1½-, 5- and 10-watt sizes.

Ford Instrument Co., 31-10 Thomson Ave., Long Island City, N. Y.

HERE IS SPARK PLUG NEWS
OF INDUSTRY-WIDE IMPORTANCE!

THIS R37S-1

CHAMPION

SPARK PLUG

IS THE *ONE* SPARK PLUG APPROVED FOR *ALL* THE RADIAL ENGINES LISTED BELOW* SINCE THEY COMPRISE THE SEVEN BASIC ENGINES USED BY ALL DOMESTIC AND FOREIGN AIRLINES AND THE USAF.

THE R37S-1 HAS THESE UNIQUE AND OUTSTANDING ADVANTAGES:

1. STANDARDIZATION ON ONE TYPE.
2. MINIMUM INVENTORY. 3. MINIMUM STOCK INVESTMENT.

*R 1820	A 2000	R 2800
R 1830	R 2600	R 3350
	R 4260	

DEPENDABILITY • PERFORMANCE • LONG LIFE

THAT'S WHY MORE AIRLINES USE CHAMPIONS THAN ANY OTHER MAKE

CHAMPION SPARK PLUG COMPANY
TOLEDO 1, OHIO

CAB Takes New Look at Nonskeds

Irregular carriers get indefinite reprieve of 'death sentence,' pending investigation of their changed role.

By F. Lee Moore

The Civil Aeronautics Board has called off its so-called economic "death sentence" of the $100-million nonsked airline business, pending formation of a brand new CAB policy. The 63 nonsked airlines now having unrevoked letters of registration and individual exemption applications in the CAB mill may continue operating.

CAB has announced it will hold a full-fledged hearing and investigation of the nonsked industry, in light of "numerous and significant changes in conditions affecting air transportation and the place of non-certificated operations in the air transportation system."

But there is a potential joker in the CAB announcement. The press release accompanying the investigation says the "order postponing the effectiveness of the 'three-and-eight-trip' limitation does not mean that any of the irregular carriers . . . can conduct operations between any two points other than on an irregular and infrequent basis."

This means the larger nonskeds must cut back their present level of operations or face CAB action to throw them out of business. CAB says it will revoke the letter of registration of any nonsked who flies regularly. This "regularity" has never been defined by CAB, but it generally has meant considerably less than 15 round trips a month between two cities.

Question is: How will CAB interpret "regular" scheduling from now on. According to the Senate Small Business Committee, its expectation was for CAB to let the 63 nonskeds operate as before until decision of the new case.

The CAB investigation order outlines the following questions that the Board will seek answers to:

- Should nonskeds stay in business, providing service supplemental to that of the certificated scheduled airlines? If so, what type service should the CAB let the nonskeds give?
- What effect would nonsked operation have on regular airlines and public welfare?
- Is CAB authorized under Section 416 of the Civil Aeronautics Act of 1938 to set up a new class of carrier with certificates of convenience and necessity?
- Should the new-type airline class be set up by exemption, temporary certificate, permanent certificate, or by various means depending on individual airline's case?
- How should CAB regulate the new so-called "3rd-class" air transport industry if such is set up?

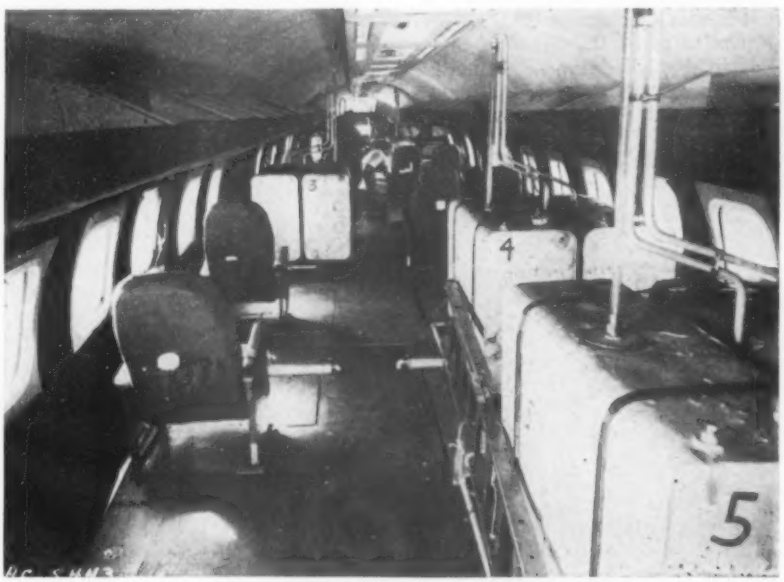
▶ **New Factors**—That is CAB's outline of the Board policy and legal questions it will decide in the investigation. The Board apparently came around to its decision to draw new regulations on a clean slate after these following recent developments:

- **New board.** The majority of the present five-man Board is new—not the same Board that started the strict regulation of nonskeds.
- **Force-out.** The strict three-trips-a-month regulation would put most of the nonskeds out of business, CAB found, and force the rest to revert to fixed-base charter business, eliminating what has now become a $100-million low-fare business that reaches a new mass market for air travel.
- **Court action**—The U. S. District Court enjoined CAB against enforcing its 3-trip limit on nonskeds, because it automatically put them out of business without benefit of a hearing.
- **Congressional pressure.** The Senate Select Small Business (Sparkman) Committee and some Senate Commerce Committee members put more and more outside pressure on the Board to reconsider its "death sentence" regulation, while CAB Member Joseph Adams argued along the same line within the Board. New CAB Chairman Donald Nyrop had taken no previous stand: he finally resolved to hold a full-blown hearing, and new Member Chan Guerney and CAB old-timers Oswald Ryan and Josh Lee followed his lead.

CAB Chairman Nyrop told Senate Committee Chairman Sparkman of the CAB's decision and reportedly promised to hold off on enforcement proceedings.

▶ **What CAB Wants**—The Board in its new order of investigation says that if it decides there should be an air coach industry, CAB will make regulations:

- To promote air transport "adapted to present and future needs of the foreign and domestic commerce of the U. S., of the postal service, and of the national defense."
- To "preserve the inherent advantages in such transportation."
- To "promote adequate, economical, and efficient service by air carriers at reasonable charges, without unjust discriminations, undue preferences or



SUPER CONNIE FLYING LABORATORY

Stripped-down first production model Super Constellation is seen loaded with water ballast tanks, pumps, electronic meters, cameras, sound recorders and other special equipment for its factory and CAA certification flight test program. Six to 12 men are required to put the big plane through its paces. During its first 24 flights the Super Connie racked up 38.3 flight hours. Photo was taken just forward of the main door.

advantages, or unfair or destructive competitive practices."

• To "foster sound economic conditions in air transportation."

• To allow competition of the type "that would assure the sound development of an air transportation system . . . . "

• To "improve relations between, and coordinate transportation by, air carriers."

• To "assure highest degree of safety in such transportation."

• To see that air coach industry is "conducted economically on a continuing basis."

• To present traffic diversion, "including the most profitable longhaul traffic (frequently referred to as 'cream skimming'), from the certified carriers."

In setting up the air coach industry, CAB says it would consider the following features in making new regulations: "A. Geographical distribution. B. Frequency and degree of irregularity. C. Types of traffic to be carried, i.e., persons, property and mail. D. Relative price of service. E. Character of obligations to the public."

▶ **Cab Enforcement Action**—At the same time CAB issued its investigation order and press release it issued special orders to two nonskeds.

• It called off enforcement proceedings against Modern Air Transport, whose letter of registration a CAB majority revoked only a few days before with a dissent by member Joseph Adams.

• It decided to proceed against Air Transport Associates, Inc., the Seattle-Alaska nonsked of Amos Heacock as a test case as a violator of CAB economic regulation part 291. (Story col. 3)

▶ **Help Wanted**—Meanwhile other large nonsked operators are looking to the Senate Small Business Committee for help. They want a CAB commitment on how many flights a month they could run under the new CAB policy pending final decision.

Asked by AVIATION WEEK how the big nonskeds could cut back to irregular business and still make money, now they've got once and twice daily services, CAB Chairman Donald Nyrop said: "We've offered these boys a fair hearing, with ammesty on past performance if they obey present regulations starting today. Granted the present schedule limit is tough on airlines with several planes on hand, the regulation stands and we can't see it violated wilfully and flagrantly before we change it.

"If these boys want to make a quick buck, they can go on violating our new orders and fight our enforcement proceding in the courts. If they are legitimate investors looking to long-term legal operation, they will abide by present regulations and make their case for changing the law during the hearings. One way they can minimize the limitations is to fly between more than one pair of cities. For instance, Miami operators can take alternate swings New York-West Coast and elsewhere."

▶ **"Cutthroat Agencies"**—As for the cutthroat agency situation, Nyrop said: "They'll have to clean that up themselves; we can't regulate the agencies." Nyrop said he could see no objection to a cooperative agency set up by the nonskeds. This would have to beat the present competitive agency situation in which some irresponsible agencies play one operator against another to gain exorbitant commissions from the sale of tickets.

It looked last week as if the next move was up to the nonskeds themselves. The Air Coach Transport Assn. holds its annual membership meeting and officers' election this week in Washington.

One big problem the nonskeds can't figure out: If they cut their operation down to infrequent operation during the year to year-and-a-half of the CAB proceeding, they may lose money all that time and end up with a CAB decision against letting them fly enough to make money anyway.

This week may reveal how CAB defines "irregular" operation and whether the big nonskeds will fight it in the courts or curtail operation for a year or so pending CAB investigation.

CAB Orders Nonsked Out of Business

On the same day CAB apparently granted amnesty to several other nonskeds whose registration letters it had previously planned to revoke, the Board ordered one nonsked out of business—Air Transport Associates, Inc. This is the Alaska-Seattle nonsked of Amos Heacock, whose allegations in Congress delayed confirmation of several CAB members' appointments.

The Board majority called Heacock's flight frequency, Seattle-Anchorage, flagrant violation of CAB Economic Regulation 291, requiring "irregular" and "infrequent" flights. Period under CAB consideration was March, 1949, through June, 1950.

Air Transport Associates' frequency averaged between 11 and 12 flights per month, Seattle-Anchorage. That is a little over one flight every three days or about two a week. Day of the week varied; nonsked did not fly at all some weeks.

CAB member Joseph Adams dissented from the Board opinion, saying he did not like "summarily stopping its operation, without first issuing an order to the carrier to 'cease and desist' from continuing violations of the Board's regulations. . . . More orderly procedure . . . has been followed in a majority of the cases handled by this Board in dealing with the problem of irregular carriers. I find no justification for taking a short cut in this case," Adams reported.

Heacock vows he will fight his case to the Supreme Court before he'll bow to the CAB decision. First, though, he had 30 days in which to file a petition for CAB reconsideration—which he plans to do.

PICK YOUR SEAT

This plane reservation chart enables Brazilian air travelers using Pan American's "O Presidente" luxury service to reserve their space aboard the plane before departure from Galeao Airport on flights originating at that terminal.

Retirement of DC-3 Postponed by CAB

In the airlines' service, old DC-3s will never die—they'll just fade away, maybe, some day, but not yet.

The Civil Aeronautics Board had

scheduled the famous transport for automatic retirement at the end of its 19th year of airline service, Dec. 31, 1953. But the Board, having gone over the DC-3s recent physical reports and continued good safety performance record, now finds the DC-3 fit and able to remain in airline operation indefinitely. There are 502 of them in U.S. airline service today.

Official announcement of the indefinite extension of DC-3 service with U.S. airlines comes in the new CAB draft release re-writing the proposed Part 40 of the Civil Air Regulations, to replace the present Parts 40 and 61.

The Board originally decided 11 years ago to set an automatic retirement date for planes not meeting newly-drawn requirements for a so-called transport category.

Four times since then the Board has waivered the DC-3 and Lodestar (11 still in airline service).

BOAC Pushes Comet N.Y.-Bermuda Plans

Jet transport service from New York to Bermuda in 90 minutes, with no vibration and little noise:

That's the competition British Overseas Airways Corp. says it plans for Pan American World Airways and Colonial Airlines next year or early the year after. Planes will be de Havilland Comets. BOAC expects to have eight this year.

Six of the Comets are scheduled to go on the London-Europe-Africa-Asia-Australian routes. Two will go to the New York-Bermuda service. More will follow.

Within a few years, BOAC plans two complete round-the-world routes. If mobilization priorities don't intervene, the routes will be flown part turbojet, part turboprop-powered, with long-range Bristol 175s. According to BOAC Chairman Sir Miles Thomas the two globe-girdling routes are to be:

- **Northern,** via North Atlantic, Canada, North Pacific, and joining present BOAC routes at Tokyo.
- **Southern,** via Atlantic, Americas, South Pacific, to New Zealand and Australia, with the help of British Commonwealth Pacific Airlines and Qantas Empire Airways of Australia.

BEA Goes Turbo

British European Airways will order only turbine transports from now on, BEA chief Peter Masefield has told the Anglo-American Aeronautical conference at Brighton.

This BEA decision is based on recent successful experimental operations of the prototype Vickers Viscount turboprop plane on London-Paris and London-Edinburgh routes.

INTEREST IN PRINCIPLE: IATA's traffic committee which faced up to coach fares, then turned away: from left to right, S. K. Kooka, Air India; man second from left unidentified; Philip Lawton, BEA (with cigaret); R. E. S. Deichler, American Airlines; E. O. Cocke, TWA; J. W. S. Brancker, BOAC, committee chairman; Dennis Handover, SAS (wearing glasses, barely visible in back row); A. Laurence Young, IATA, committee secretary; Walter Sternberg, National; fourth man from right, in background, unidentified; R. W. Ireland, UAL (front row, with lapel badge); W. G. Lipscomb, PAA; and Gordon Wood, TCA.

PAA to Go Own Way on Coach

IATA members again fail to reach definite decision on low-cost Atlantic service, so PAA plans to start Apr. 1.

Pan American World Airways, the long-time maverick in the International Air Transport Assn.'s carefully built corral of world air fares, is threatening to jump right over the fence to get its freedom to operate coach service across the North Atlantic.

▶ **Lone Wolf**—PAA followed up an indecisive London meeting by IATA's traffic committee on so-called "tourist fares" by announcing it would start the low-cost service next Apr. 1, whether or not any other IATA members went along.

PAA's proposed rate will be between $225 and $250 one-way, New York-London. The closest which IATA members at the London meeting would come to agreement was between $275 and $300. And there was no firm agreement on that, and on the even more important question of when the service would begin.

Pan American for years has been advocating coach service across the Atlantic, and has been more insistent since the success of its Latin American low-cost operation which began several years ago. It seemed to be making headway last May when a meeting in Bermuda came to grips with the tourist service problem.

In Bermuda, the association's traffic committee agreed to start the service in the fall of 1952, and appointed a subcommittee to work out terms and conditions, including a precise fare, between $225 and $250.

Then the Civil Aeronautics Board entered the situation. While having no affirmative power to set passenger fares on international routes, CAB must approve interline agreements, which is exactly what an IATA pact is.

▶ **CAB Exceptions**—CAB took exception to the Bermuda decision because the Board thought the service should start sooner; the agreement did not specify high-density seating such as CAB is insisting on for domestic coach operations; and the Board disagreed with the proposed frequency of four flights a week.

It was with this rebuke in mind that the IATA traffic committee got together in London to try to nail down the tourist service. All airlines represented seemed to accept tourist service in principle. But getting acceptance on firm plans proved something else again.

Pan American declared that the conference should build on the fare base set at Bermuda: $225-250. But the conference this time wouldn't even accept that. Only firm decision was launched a "controlled experiment" some time in 1952 and to talk the project over again at a November meeting in Nice, France.

The results brought from Willis G. Lipscomb, PAA vice president-sales and traffic, the comment: "Once again it seems that Pan American has been denied approval of its long-sought objective of introducing tourist service on the North Atlantic. . . . Opposition to the proposal was led by certain airlines which have been most vocal in recent

Piasecki

"The Fastest Growing Co. In The Industry"

Needs

DRAFTSMEN

and

ENGINEERS

With

Aircraft Experience

On

- AIRFRAMES
- CONTROLS
- ELECTRICAL INSTALLATION
- POWER PLANT INSTALLATION

Also

Stress, Weight and Vibration Engineers

Premium Pay for Overtime. Excellent Company Benefits. Paid Vacation & Holidays. Real Opportunity to Advance With a Leader in The Rapidly Expanding Helicopter Industry.

Write, Giving Detailed Resume of Experience & Education to — Engineering Personnel Manager

PIASECKI HELICOPTER CORP.
Morton, Pa.

A Philadelphia Suburb
NEAR SWARTHMORE

months, since the Bermuda meeting, stressing the virtues of tourist fares."

Main arguments at London against the tourist fare was insistence by foreign carriers on a 17% profit on overall operations (which tourist fares would dilute); a further 5% profit as a hedge against inflation; and the foreign carriers' assertion that more flights due to tourist fares mean higher costs.

Pan American disagrees with all three points and particularly the last. PAA says the foreign lines are basing cost estimates on a 65% load factor while PAA, the only carrier concerned that has operated international coach service, has always had at least a 75% load factor on coach flights.

Air coach planes must carry more passenger seats, PanAm contends, so the yield per fully loaded flight would be the same or better and number of flights would be more, as economic studies show lower fares vastly expand potential market.

▶**Hurdles Ahead**—With its announcement that it will start tourist service next April even though no other carrier does, PAA obviously is hoping to force some definite action at the Nice meeting in November. It may not succeed because there are some high hurdles along PAA's unilateral course.

PanAm claims it has a perfect right to start its own coach service, without giving up IATA membership, even though no other IATA member goes along. It says fares are dependent upon unanimous agreement by all carriers involved. If there is not unanimity, there is an "open rate" situation where each carrier can make its own rules.

That, however, still leaves the government angle. While CAB's powers over international fares may be uncertain, its powers over PAA's mail rate are not. And low passenger fares sometimes mean a mail rate so high CAB objects. But even if CAB backed PAA, foreign governments would still have to approve PAA's fares. This approval might be tougher to get, particularly in Britain.

PAA doesn't think so. It believes that BOAC, a die-hard opponent of a $225-$250 fare, is not representing the government view—even though BOAC is a state corporation. And PanAm says the same thing about Air France.

PAA is counting on the lure of more dollars from tourists to swing the foreign governments to the side of low-cost trans-Atlantic air service. In a speech last week before the Foreign Trades Assn. of Philadelphia, PAA President Juan T. Trippe said that the $1 billion American tourists spent abroad in 1950 could be increased to $3 billion if air fares were low enough to stimulate increased travel abroad.

PanAm hopes that will be its most potent argument for tourist fare air travel.

Subsidy Bill Seen Favoring Sked Lines

Legislation separating airmail pay from subsidy passed by the Senate added up to a victory for the scheduled airline industry on the major points at issue.

House action on the measure is not likely before the new session convenes in January.

▶**Provisions**—The Senate-passed bill provides:

• **Five categories** of compensatory mail pay ranging from 45 cents a ton mile for the Big Four to $1.80 for local carriers. These rates would be effective until and when the Civil Aeronautics Board, after hearings, establishes different compensatory rates.

• **A compensatory rate** for international carriers of "not to exceed" the Universal Postal Union rate, now pegged at $2.86 a ton mile.

• **Direct subsidy grants** to certificated mail carriers in the "commerce" or "national defense" interests. CAB is authorized to enter into three-year subsidy contracts with domestic lines and five-year contracts with international carriers, with discretion as to whether to make binding contracts or contracts subject to later revision, upward or downward.

▶**Freight Carrier Bar**—The Senate also barred certificated freight lines from subsidization. An amendment by Sen. Brien McMahon restricting subsidies to lines certificated to carry mail was adopted 53 to 28, over the protest of the Department of Defense which reported a primary interest in development of freight airlift.

Undersecretary of the Air Force, John McCone, had written Sen. Edwin Johnson, author of the separation legislation: "It is the opinion of the Department of Defense that it would appear to be inconsistent to deny to the government the possibility, if desirable in the national interest, of subsidizing operators of heavy-freight aircraft requiring little conversion for military use."

The opposition to the McMahon amendment was lead by Sens. George Aiken, Paul Douglas, Herbert Lehman and John Williams. Aiken predicted it will "contribute toward a monopoly of the already existing international carriers which have mail certificates . . . handicap the armed services in the event we ever wished to subsidize non-mail certificated airlines in an emergency . . . and possibly will add considerably to the cost of government." McMahon argued that the certificated freight lines have repeatedly stated that they do not want or do not need government subsidization.

The Senate struck out the words

"without reduction" in providing for three-year domestic airline subsidy contracts and five-year international subsidy contracts. This would have permitted CAB to revise contracts upward, but not downward. Sen. Owen Brewster led the opposition to this revision.

An amendment by Sen. Douglas which would have geared compensatory mail rates for international carriers to actual cost of carrying the mail was defeated 58 to 23. The Douglas amendment was urged by Postmaster General Jesse Donaldson and endorsed by CAB. Pointing out that the mail cost over the trans-Atlantic route is only 85 cents a ton mile for Trans World Airlines and 98 cents for Pan American Airways, Douglas argued that the $2.86-a-ton mile Universal Postal Union rate will provide "a substantial layer of subsidy in a rate that purports to be a compensatory rate."

But a Douglas amendment was adopted providing for termination of subsidy payments to any carrier whose agents or representatives have provided gratuities of any type, including entertainment, to a government official "with a view toward securing favorable treatment."

▶ **Aiken Objection**—Sen. Aiken observed: "If there is any bill which tends to build up an almost air-tight monopoly for a single part of a single industry, this is it. I want to make myself clear on the record as having no part in building an absolute monopoly in air transportation between America and Europe for any one or two single airlines . . ."

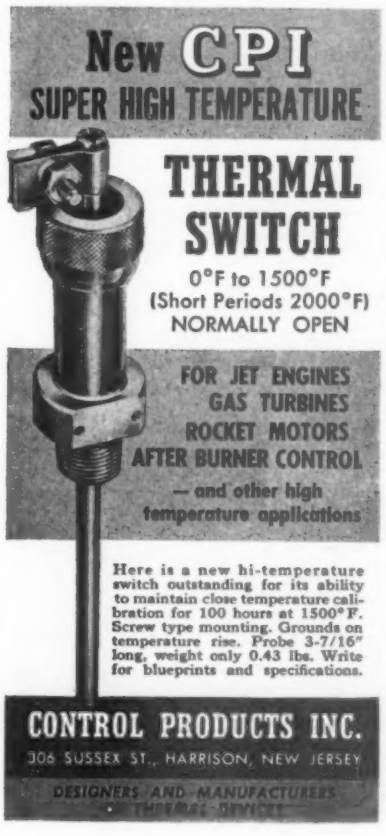
3-Class Service

Steerage, standard and luxury accommodations will all be available on the same plane when United Air Lines starts flying a proposed experimental West Coast daily service. United offers three classes of service at three prices on a daily Los Angeles-San Francisco-Seattle Stratocruiser flight.

On a sold-out three-class UAL flight between Los Angeles and San Francisco, 14 coach passengers will ride in the lower-deck lounge and pay $17; 55 standard-fare passengers will ride in the main (upper) cabin and pay $21.05; and a small family or business group wanting privacy will ride in the stateroom and pay $26.05 each, excluding tax.

This daily three-class flight will be in addition to United's present 19 daily roundtrips, Los Angeles-San Francisco, and seven roundtrips, San Francisco-Seattle.

PRECISION
DROP
FORGINGS
for AIRCRAFT use
Produced in accordance with aircraft specifications . . . from alloy, stainless, and carbon steels . . . aluminum, brass, bronze, and copper. . . . also aluminum castings.
CONSOLIDATED INDUSTRIES
INCORPORATED
West Cheshire, Conn.
West Coast Representative
A. C. Stearns Co.
3911 San Fernando Road
Glendale, California

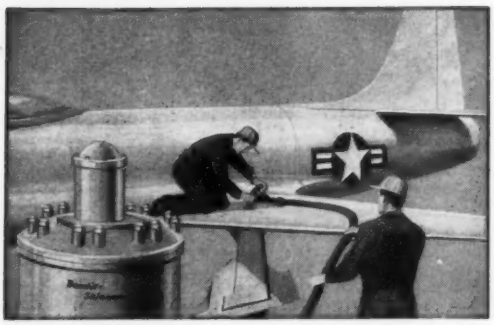

New CPI
SUPER HIGH TEMPERATURE
THERMAL
SWITCH
0°F to 1500°F
(Short Periods 2000°F)
NORMALLY OPEN
FOR JET ENGINES
GAS TURBINES
ROCKET MOTORS
AFTER BURNER CONTROL
— and other high temperature applications
Here is a new hi-temperature switch outstanding for its ability to maintain close temperature calibration for 100 hours at 1500°F. Screw type mounting. Grounds on temperature rise. Probe 3-7/16" long, weight only 0.43 lbs. Write for blueprints and specifications.
CONTROL PRODUCTS INC.
306 SUSSEX ST., HARRISON, NEW JERSEY
DESIGNERS AND MANUFACTURERS

Bendix-Skinner

ORIGINATOR OF **MICRONIC** FILTRATION

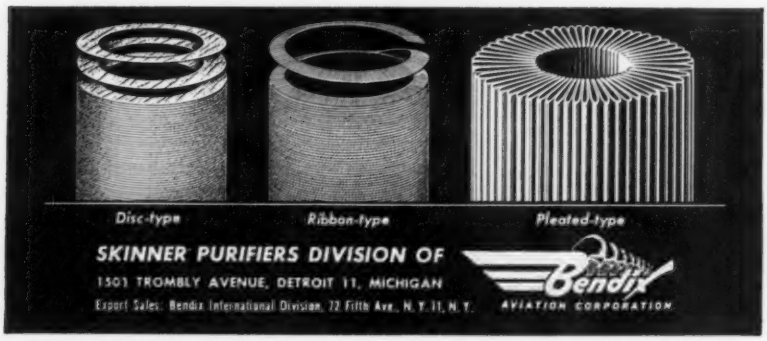
the *Finest*

Name in Filtering



Whenever there can be no uncertainty about fineness of filtration, rate of flow or filter collapse, ***Bendix-Skinner*** gets the call. In fact, ***Bendix-Skinner*** has been handling the hardest jobs for over twenty years. From this experience have come new and exclusive filtering techniques that assure better performance on any job, *nine times out of ten.* Write for details of the filters backed by Bendix and built by Skinner.

Over 350 Models providing filtration from ½ micron (.000019") upwards at flow rates from 1 to 5000 g.p.m.



SKINNER PURIFIERS DIVISION OF

1301 TROMBLY AVENUE, DETROIT 11, MICHIGAN

Export Sales: Bendix International Division, 72 Fifth Ave., N. Y. 11, N. Y.

Bendix AVIATION CORPORATION

CAB Will Slash Temporary Mail Pay

Slashing temporary mail pay rates of most airlines' has been announced as a new policy of the Civil Aeronautics Board. CAB said it decided to cut mail pay "in light of changed conditions, including sharp upturns in traffic volumes; and, in order to avoid overpayment of temporary mail compensation and a consequent necessity for recapture of such overpayments. . . . "

CAB says it will chop the rates to "only such amounts as are deemed necessary for operations prior to establishment of a final rate." The Board believes that in most cases this objective will be met if payments are only what CAB originally figured would enable the airline to break even. Now the airlines are flying considerably better load factors. The original break-even figure now allows an adequate profit, CAB feels.

The original temporary mail pay policy announced Feb. 26, 1949, was to fix a temporary rate as close to estimated final rate as possible. The new change is timely, CAB says, "in view of the greatly increased financial stability of the air transport industry and the major progress made by the Board in its mail rates program, in that final rates are now (either) established, proposed or in process for most of the carriers."

Air Packaging

Royal Dutch Airlines (KLM) is using plastic containers, taking about 20 dresses or coats each, for air transport of textiles and clothing. A special light alloy bracket, which can secure up to six of the containers, is attached to the plane's floor.

Previously KLM packed the garments in individual cardboard boxes for such shipments.

Capital Pilots Pact Based on Mileage

Capital Airlines and its pilots have signed a new pilot working agreement, retroactive to last Jan. 1. Like the revolutionary Eastern Air Lines agreement, this contract calls tor pilot pay by the mile flown (AVIATION WEEK Sept. 10, p. 16).

Main differences between the Capital and Eastern contracts are due to differences in their equipment. Capital plans to continue to operate DC-3s and DC-4s along with its Constellations. Eastern has an all-new fleet of faster planes on order.

Air Line Pilots Assn. says that, in

some ways, the Capital contract pays better than the Eastern contract.

American Airlines and United Air Lines still hold out against the mileage pay formula. Observers say United President W. A. Patterson is so dead set against any mileage pay plan that the pilots will probably offer a different formula that nevertheless provides equivalent or better pay concessions than Eastern's. American Airlines final policy on mileage pay is not yet announced.

North-South Merger Brew Thickens

A Colonial-Northeast Airlines merger agreement reportedly near final signature sets up a brighter goal than ever for Capital, Delta, and National Airlines. These three are each now competing for CAB favor to become the one airline to merge with Colonial-Northeast, thus linking both Northeastern U. S. and Canada with the Deep South, they have been working on merger agreements with Northeast and/or Colonial some time. But CAB recently announced an investigation of the various merger possibilities among Capital, Colonial, Delta, National and Northeast and consolidated last year's Delta-Northeast merger application within the broadened case.

Several years ago, Capital and Northeast dropped a merger proposal when hard times made Capital's position uncertain, before its management reorganization. The Delta-Northeast merger agreement was signed, and application for CAB approval made last year. This August, National President G. T. Baker with an officer of Atlas Corp., major shareholder of Northeast, talked with CAB members about a proposed National-Northeast merger agreement.

Some CAB officials are alarmed at the size of the new merger investigation's scope; it proposes alternate combinations of all or parts of five big airlines, with several local airlines. Any proposed combinations of Northeast-Colonial with Capital, Delta or National are bound to meet a bitter fight from American and Eastern.

SHORTLINES

▶**All-American Airways**—Carrier may change its name to avoid confusion with a Miami nonsked of the same name. . . . AAA set a new record of 25,850 passengers which were carried this August.

▶**Alaska Coastal Airlines**—Would get

FORD control motors . . .

for extremely low inertia and high frequency response

10 Watt

Rotor Inertia 0.23 oz-in.² Weight 4.3 lbs.

HIGH VOLTAGE MOTORS

60 Cycle, 1½-5-10 watt models
Designed specifically for electronic systems—operate directly in the plate circuit of a vacuum tube amplifier.

LOW VOLTAGE MOTORS

60 and 400 Cycle, 2½-5-10 watt models
Recommended for normal two-phase applications.

advantages

- Linear torque—voltage characteristics
- Linear torque—speed characteristics
- Withstand continuous stalling
- High torque efficiency
- Flexibility of mounting

Write for Descriptive Brochure about all Ford Control Motors.

FORD INSTRUMENT COMPANY
Division of The Sperry Corporation
31-10 Thomson Avenue, Long Island City 1, N. Y.

INSTANT AUTOMATIC FLOW and SHUT-OFF

QUICK CONNECTION and DISCONNECTION

WHY *Genuine* HANSEN COUPLINGS GIVE BETTER SERVICE LAST LONGER

Leak-Proof Minimum Wear Locking Device

Integral Factory-Assembled Tamper-Proof Socket Head

Locking pins in Hansen Posh-Tite Coupling Socket afford large area contact with plug, thereby preventing wear and subsequent leakage.

PICK GENUINE HANSEN COUPLINGS FOR HANSEN PERFORMANCE . . .

● To connect a Hansen coupling, you merely push the plug into the socket with one hand. Flow is instantaneous. To disconnect, push back sleeve on socket—coupling disconnects. Flow is shut off instantly and automatically.

Write for catalog giving complete range of types and sizes.

REPRESENTATIVES

BALTIMORE, BIRMINGHAM, CHICAGO, CLEVELAND, DALLAS, DAYTON, DENVER, DETROIT, FT. WAYNE, HARTFORD, LOS ANGELES, LOUISVILLE, MILWAUKEE, MINNEAPOLIS, NEW ORLEANS, PITTSBURGH, ROCHESTER, SAN FRANCISCO, SAVANNAH, SEATTLE, ST. LOUIS, MONTREAL • TORONTO

Export Department: Cleveland

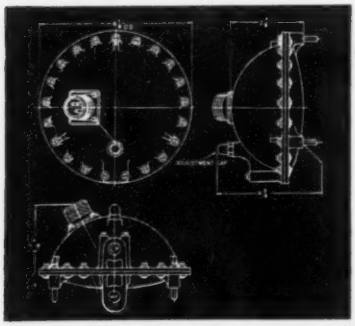
THE HANSEN MANUFACTURING COMPANY
4031 WEST 150th STREET • CLEVELAND 11, OHIO

AEROTEC PRESSURE SWITCHES

HELP MAKE TODAY'S AIRCRAFT

Safer Than Ever!

Greater safety for your planes is the goal of every Aerotec designed control. To cover every possible contingency, our instrument specialists have developed hundreds of different types of controls. Below are a few typical examples of Aerotec pressure switches covering a host of applications. Aerotec is supplying thousands of controls of these types to meet today's demands. They are playing an important part in raising the high standards of safety on commercial and military aircraft.

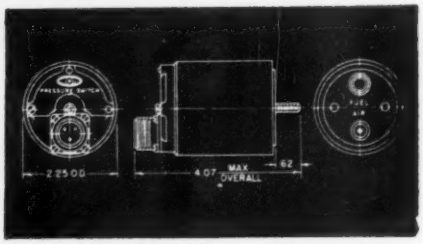


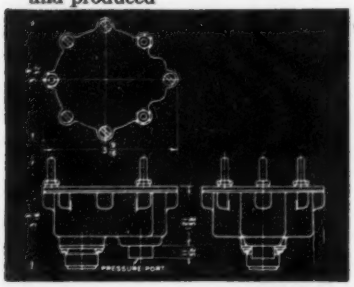
SENSITIVE LOW PRESSURE SWITCH SERIES P904

Differential Type for Ram Air
Sensitivity: 1/10" H_2O
Actuating Pressure Range: 1.50" H_2O to 3 psi with differential of 20% of applied pressure
Electrical Rating: 28 VDC 5 Amp. inductive
Complies with A.F. environmental specification 41065-B
For stall and flap warning applications and as safety switch for cabin de-icing heaters.

PRESSURE SWITCHES SERIES M800

Gage, Differential, Types
Actuating Pressure Range: 2.5 psi to 200 psi
Mediums: MIL Fuels, hydraulic fluids, air
Electrical Rating: 28 VDC 3 Amp. inductive to 45,000 ft.
Complies with A.F. environmental specification 41065-B
Over 80 different types designed and produced





HIGH PRESSURE SWITCHES SERIES T100

Actuating Pressure Range: 200 psi to 5000 psi
Mediums: MIL Fuels, air, hydraulic fluids
Electrical Rating: 28 VDC 5 Amp. to 45,000 ft.
Temperature Range: −65° F. to +170° F.
Proof Pressures up to 7500 psi

We invite your inquiry. Write or call any of the following:

AIRCRAFT REPRESENTATIVES

DAYTON 3, OHIO	NORWALK, CONN.	SEATTLE 2, WASH.	LOS ANGELES 43, CAL.	WICHITA 8, KANSAS
Jay Engineering Co.	John S. Hammond, Jr.	Stanley R. Brett	Forsaas Engr. Co.	J. E. Freeman & Assoc.
1517 East 3rd Street	394 West Avenue	John E. Freeman & Assoc. 1616-F 43rd North	4545 West 62nd Street	4913 East Lewis Street

Project Engineers

THE THERMIX CORPORATION
GREENWICH, CONNECTICUT

Canadian Affiliates: T. C. CHOWN, LTD.
1440 St. Catherine St. W., Montreal 25, Quebec • 50 Abell St., Toronto 3, Ontario

THE AEROTEC CORPORATION
AIRCRAFT DIVISION GREENWICH, CONNECTICUT

Designers and Manufacturers of Automatic Controls—*Valves:* Regulating, Relief and Check Types—*Pressure Switches:* Gage, Altitude, Differential and Absolute Types—*Float Switches:* Top, bottom or side mounted—Single, Dual or Tandem.

a retroactive raise in mail pay under CAB show-cause order. From June 1, 1950, to June 30, 1951, the company would get an extra $20,000, then base rate per mile, July 1 to Sept. 30, 1951, of 60 cents. Thereafter: Apr. 1-Sept. 30 each year, 60 cents; and Oct. 1-Mar. 31, $1.12 a mile.

▶ **American Airlines**—August traffic of 247,371,000 passenger miles almost topped the June record of 248,043,000, was 4¼% over July; AA expects that September topped them all. . . . Carrier has signed an interline air taxi agreement with Provincetown-Boston airline.

▶ **California Eastern Airways**—Is directed by a Chancery Court to hold a special stockholders' meeting to elect directors Oct. 10 at Corporation Trust Co., resident agent at Wilmington, Del. A stockholder owning 18,132 of the 1,124,000 shares outstanding got the court to call the meeting of stockholders.

▶ **British European Airways**—Starts London-Paris service with the new 49-seat Airspeed Ambassador Oct. 21. It is a high-wing transport with two 2,600-hp. Bristol Centaurus 18-cylinder radial engines, grossing over 26 tons. Cruising speed is 245 mph. at 15,000 feet.

▶ **Central Airlines**—Carried over 4,000 passengers in August—a record for this local. Total passenger figure, January-August this year, is 18,869, all on 24-passenger DC-3S.

▶ **El Al Israel Airlines**—Is the new corporate name of the former El Al Israel National Airlines.

▶ **Flying Tiger Line**—Has moved nearly 11,000 farm workers from Puerto Rico to harvest fields in the northeastern U. S. since April. Four 60-passenger C-46s and one 100-passenger DC-4 were used in transporting the large number.

▶ **International Air Transport Assn.**—Traffic conference may set up a traffic management committee, recommended by R.E.S. Deichler of American Airlines to keep up with management and economic problems. Deichler says the committee should study many basic traffic policies "in the light of their effect on the trend of fares and rates and primarily on profits. The tourist service is a good example of how an emotion for a popular service can very well overcome the hard facts of business."

▶ **National Airlines**—Estimates June-July-August net profit at a total

ENGINEERS

wanted at once

for

LONG-RANGE MILITARY AIRCRAFT PROGRAM

by

NORTH AMERICAN AVIATION, INC.

Los Angeles, California
Columbus, Ohio

Unusual opportunities for Aerodynamicists, Stress Engineers, Aircraft Designers and Draftsmen, and specialists in all phases of aircraft engineering. Engineering skills other than aircraft may be adaptable through paid training program. Also openings for

Recent Engineering College and Technological Graduates

Long-range military program offers fine chance for establishing career in aircraft while aiding defense effort. Transportation and established training time paid. Salaries commensurate with experience and ability.

Please include summary of education and experience in reply to:

Engineering Personnel Office
SECTION 3

NORTH AMERICAN AVIATION, INC.

Los Angeles International Airport
Los Angeles 45, Calif.
or
Columbus 16, Ohio

$300,000, compared to $166,000 a year ago, after federal income taxes. . . . Passenger miles, July-August, gained 54% over a year ago; August's 30,613,927 revenue passenger miles were up 49%. Says Treasurer J. C. Brawner: " . . . We should be able to move into our heavy winter season nearly 50% ahead of our position last year." The new daylight coach service operated at a 70% load factor the first 12 days after inauguration. . . . Carrier has extended its $109 "piggy bank" excursion from Sept. 30 to Dec. 15.

▶ **Northeast Airlines**—DC-3 made a forced wheels-up landing at Weymouth, Mass., Navy dirigible base after one engine caught fire. No one was hurt. Plane was bound from Boston to New York.

▶ **Pan American World Airways**—Has started flying a third weekly 56-passenger Stratocruiser flight to Tokyo. Pan Am expects a rapid build-up in travel to Japan. Even before World War II, 40,000 Americans visited Japan in peak tourist years.

▶ **Piedmont Airlines**—Carried a record 20,355 passengers in August; load factor was 57%, also a record.

▶ **Portland International Airport**—Is the new name of the former Portland Columbia Airport. City fathers renamed the airport on completing a 9,000-ft. runway, claimed as the longest commercial strip on the West Coast.

▶ **Seattle-Tacoma International Airport**—Reports air passenger traffic through Seattle up 21% over a year ago to 413,925 the first seven months this year.

▶ **Southern Airways**—Flew three times as many passengers (10,006) this August as last.

▶ **United Air Lines**—Has released a full-color film dealing "frankly" with weather problems and their efficient solution; the 30-minute documentary covers flight planning, cockpit procedures, instrument airport approach, and other features of a coast-to-coast flight. Title is "United 6534". . . . UAL set a company record flying 199,557,000 revenue passenger miles in August, 29% over a year ago.

▶ **Wien Alaska Airlines**—Would get retroactive mail pay gain in a CAB show-cause order: $100,000 over past payments Jan. 1 1943, to Mar. 31, 1951; thereafter: 76 cents a mile, April-September, and $1.21 a mile October-March.

LOCKHEED
AIRCRAFT CORPORATION
Georgia Division
Marietta, Georgia

Excellent opportunities for key positions in long range production program

CAN YOU QUALIFY?

FLIGHT TEST ENGINEER
College degree, preferably in aeronautical engineering experience. Exceptional opening for qualified person with administrative and supervisory ability.

RESEARCH ENGINEER
Outstanding opportunity for man with Master's or Doctor's degree and 4 years actual experience in aircraft research and laboratory. Must have administrative ability.

DESIGN ENGINEER "A" and "B"
Must have aircraft design experience (structural, electrical & power plant.)

TIMEKEEPING GROUP SUPERVISOR
Must be familiar with IBM timekeeping system. Experience with large industrial payroll of several thousand employees essential. Accounting training or experience helpful.

Enjoy North Georgia's healthful year-round climate and famous scenic beauty . . . only 8 miles from Atlanta

Write TODAY to

Mr. Frank J. Johnson
Employment Manager
LOCKHEED AIRCRAFT CORP.
594½ Peachtree St. N.E.
Atlanta, Georgia

CHANCE VOUGHT AIRCRAFT

builder and designer of the "Cutlass" and "Corsair," has openings for top level technical personnel in electronics and aerophysics for supervisory positions in long range development and design programs on piloted and pilotless aircraft. Reliability supervisor—to supervise the establishment and maintenance of optimum reliability of electronic and controls systems. Requires degree in electrical engineering, advanced studies in mathematics plus 7 to 8 years related experience. Guidance supervisor—to direct a group in the analysis, design and development of electronic guidance systems for pilotless aircraft. Requires special knowledge of guidance, design and control problems. Requires M. S. in electrical engineering with 7 to 8 years related experience. Aerophysics supervisor and aerophysics project engineers—to direct a group in the analysis and solution of problems establishing requirements and specifications for electronic and control systems in relation to aircraft performance. Requires intensive knowledge of physics, mathematics, aeronautical engineering and highly specialized knowledge in the field of automatic controls. Equivalent to Ph.D. and 5 to 8 years related experience. Excellent salaries and working conditions. Housing readily available in Dallas area. Liberal moving allowance. Submit resume of education and technical experience to engineering personnel office.

Chance Vought Aircraft Division
UNITED AIRCRAFT CORPORATION
P. O. Box 5907 • Dallas, Texas

ELECTRONIC AND ELECTRICAL ENGINEERS

One electronics instrumentation engineer with degree in EE or Physics, preferably some graduate study, and 5 years minimum experience, for permanent position in charge of electronics lab. associated with our aero. engineering laboratories. Also some openings for electrical engineers with less experience. Sal. commensurate with experience. Liberal employee benefits. Housing not a pressing problem. Submit details of educ. and experience to

UNIVERSITY OF MINNESOTA
Department of Aeronautical Engineering Laboratory
Rosemount, Minnesota

NOW AVAILABLE
AN : AND : NAF : NAS STANDARD PARTS BOOKS
"AN" Books 2 vols.—$30.00 per set
"NAS" Books 1 vol.—$15.00 per set
Quantity Discounts : 10 days trial : Dealers Invited
CORYDON M. JOHNSON CO., Inc.
Bethpage, N. Y. (Hicksville 3-2210)

ANODIZING & COLORING ALUMINUM PARTS
Government Specifications
Low Cost
ALL-BRITE CHEMICAL CO.
Oakville, Conn.
Phone: Watertown 2-1225

MECHANICAL STRESS ANALYSTS

Unusual opportunities for important analytical work on HELICOPTER transmission systems

ALSO

many openings for qualified

Mechanical & Structural

DESIGNERS
DRAFTSMEN
CHECKERS
LOFTSMEN

Send detailed resume to

Personnel Manager
KAMAN AIRCRAFT CORP.
WINDSOR LOCKS, CONN.

STRESS ANALYST AND LAYOUT ENGINEERS

for military aircraft engineering in small expanding company.

ANDERSON, GREENWOOD & CO.
Municipal Airport, Houston 17, Texas

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITION VACANT

MECHANICAL ENGINEER, $5400 per annum. Responsible for professional maintenance duties on aircraft systems and accessories such as fuel, oxygen, heating, ventilating, and fire prevention systems, oil coolers and carbon dioxide equipment. Applicants may write or contact in person the Employment Office, Room 0015-A, Main Navy Building, Washington, D. C.

POSITIONS WANTED

COMMERCIAL PILOT presently flying International Captain on Constellations for Foreign Airline desires Permanent Position as principal pilot for large corporation. Four years international captain throughout South America, Europe, Africa and two years domestic pilot. Major Air Force Reserve. Age 28, married, perfect health. Airline Transport Rating, 6,200 hours. Will consider any location. PW-1880, Aviation Week.

PILOT-MECHANIC: Commercial Flight Instructor, Single, Multi-engine, Instrument, Flight Engineer & A&E, Fifteen years military & civilian accident-free experience; successful airport management. Competent and thoroughly responsible; references in regard to character and ability. PW-1922, Aviation Week.

YOUNG, SINGLE, ambitious A&E mechanic with six years versatile experience & two years engineering desires a position with a future. PW-1940, Aviation Week.

SELLING OPPORTUNITY WANTED

SALESMAN calling on aircraft companies and suppliers, desires aircraft fittings line for the West Coast area. 20 years experience selling parts. Box 11, Los Angeles 35, Preuss Station, Calif.

FOR SALE

For Sale—Flying schools and airports. Leonard J. Schrader, 509½ East Green St., Champaign, Ill. Phone 2094.

Twin Beech D-18S

Serial A-352. Hydromatics. Zero time engines. Total airframe 2321 hours. Dual Bendix ADF's. ARC 3 24 channel VHF. RTA 1B. Bendix MB. RA-10 range receiver. Oxygen. Dual instrumentation. Aeroquip. Chrome slide tubes. Zero time since 1000 hr. Gyrosyn compass. Perfect inside and out. $65,000.00. D. G. Stanley, Ohio Aviation Company, Dayton Municipal Airport, Vandalia, Ohio. Phone 4-4646.

WANTED

WANTED!
GENERATORS
NEW OR USED
P1's: Any make
P2's: Bendix Eclipse
R1's & R2's: J. & H. or G.E.
TOP PRICES PAID!
Phone REgent 7241 • COlfax 4280 (Evenings)
Write Or Wire
LEJAY MANUFACTURING CO.
2911 SOUTH EMERSON AVE.
MINNEAPOLIS 8, MINN.

AIRCRAFT PARTS WANTED
Will purchase partial or complete inventories of AN parts, instruments, fittings, conduit, bearings, hardware—anything for aircraft.
No inventory too small—call, wire, or write.
AIRCRAFT COMPONENTS INC.
Benton Harbor, Michigan
"Aviations' Leading Supply House"

WANTED
BALL AND ROLLER BEARINGS
SMALL OR LARGE LOTS
New and Unused
Phone Republic 2-9153
RUART SALES COMPANY
4617 W. Adams Blvd., Los Angeles 16, Calif.

WANTED — AIRCRAFT PARTS
AN Fittings & hardware — Electrical parts
Pulleys & bearings — Engine parts
Accessories & components — Instruments
Aircraft material of every nature
Will purchase complete inventories or individual items. Send your listings or samples to:
COLLINS ENGINEERING COMPANY
9050 Washington Blvd. Culver City, Calif.

AC SPARK PLUG DIVISION
of
GENERAL MOTORS CORPORATION

PRECISION INSTRUMENT PLANT

Positions now available for highest caliber personnel in the field of airborne automatic, electro-mechanical control equipment.

MECHANICAL DESIGN ENGINEERS
ELECTRONIC ENGINEERS
SERVO ENGINEERS
JUNIOR ENGINEERS

New and expanding division of an established firm with 20 years of successful experience in the instrument field. Work involved deals with the manufacture and development of highly complex equipment of the most advanced type.

Write or Apply

AC Spark Plug Division
GENERAL MOTORS CORPORATION
1925 E. Kenilworth Place
Milwaukee 2, Wisconsin

Rockets

Missiles

Flying Boats

Advanced Military Aircraft

Commercial Airplanes

Guidance Systems

VARIETY SPICES THE LIFE OF **ENGINEERS** WORKING WITH **Martin**

Needed Now!

Cabin Conditioning Engineers
Three years' experience required.

Power Plant Engineers
Three years' experience—jet engine analysis, design and test background.

●

Martin has the greatest diversity of projects of any aircraft company in the East. Offers greater opportunities for development, career positions for qualified engineers. Submit strictly confidential resume outlining qualifications in detail. Personal interviews arranged.

THE GLENN L. MARTIN CO.
Personnel Dept. • Baltimore 3, Md.

ENGINEERS

GOODYEAR AIRCRAFT

Goodyear Aircraft Corporation, one of the oldest aircraft development organizations in the field, now offers unusual opportunities to engineers, both experienced and recent graduates, in all branches of aircraft design and development.

In addition to manufacturing airplanes and airships, Goodyear Aircraft builds a number of vital aircraft components as well as guided missiles, radar and other material for the defense program. The diversification of products, beyond purely defense needs, at Goodyear Aircraft, has resulted in an unusually stable and progressive organization throughout post war years.

Salaried positions with accompanying liberal employee benefits and bonus for extended work week are open to

AERONAUTICAL **ELECTRICAL**
MECHANICAL **ELECTRONICS**
CIVIL **INDUSTRIAL**

ENGINEERS

for

DESIGN AND DEVELOPMENT

of

AIR FRAME STRUCTURE **LANDING GEAR AND HYDRAULICS**
EQUIPMENT AND POWER PLANT INSTALLATIONS
ELECTRONIC AND ELECTRICAL SYSTEMS
WHEELS AND BRAKES **MECHANICAL COMPONENTS**

Personnel are needed in the following classifications:

DESIGNERS **DRAFTSMEN**
PHYSICISTS **MATHEMATICIANS**
DEVELOPMENT ENGINEERS **TOOL ENGINEERS**
STRESS AND WEIGHT ANALYSTS

Previous experience and formal education desirable. However, applicants without formal education but with equivalent practical experience in other engineering fields will be given consideration.

You are invited to investigate these opportunities by submitting a resume of your qualifications and experience or by simply sending for an application either of which will be given prompt and serious consideration.

Address all correspondence to
Mr. C. G. Jones, Salary Personnel Department

GOODYEAR AIRCRAFT CORPORATION
AKRON 15, OHIO

AIRCRAFT & ELECTRONIC EQUIPMENT

As a leading supplier we offer a complete line of

BRAND NEW INSTRUMENTS

- FLIGHT & NAVIGATION INSTRUMENTS
- ENGINE INSTRUMENTS
- AUTOMATIC PILOTS
- INVERTERS
- AUTOSYNS
- PRECISION AUTOSYNS
- RATE GENERATORS
- SYNCHROS
- ALNICO FIELD MOTORS
- GYROS
- A C MOTORS
- D C MOTORS
- SERVO MOTORS
- TORQUE UNITS
- TORQUE AMPLIFIERS
- FREQUENCY METERS
- BLOWER ASSEMBLIES

Write for complete listings

All Instruments May Be Purchased C.A.A. Certified

U. S. Export License-2140

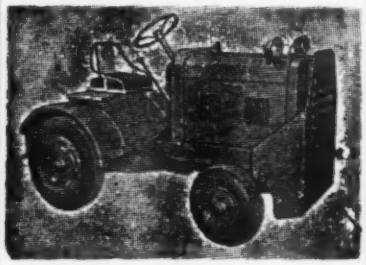
WUX Great Neck, N. Y.

INSTRUMENT ASSOCIATES

363 Great Neck Rd., Great Neck, N.Y.
Tele: Great Neck 4-1147

U. S. SURPLUS TRACTORS

CLARKTOR "6"



F.O.B. PITTSBURGH $475

FORBES MOTOR CO.

111 Penn Ave. Pgh. 21, Pa.
CH. 1-9283

LARGE STOCKS OF SURPLUS PRATT & WHITNEY ENGINE PARTS AND TOOLS

FOR THE

R-985, R-1340, R-1830, R-2000 and R-2800 ENGINE

IMMEDIATE SHIPMENT FROM OUR WAREHOUSE

Foreign Inquiries Invited

MORCO TRADING CORPORATION

212 South Robertson Boulevard
Beverly Hills, California
CABLES: "MORCO BEVERLYHILLS"
Owners of P&W Engine Parts

DOUGLAS C-47A

Available for inspection October 10th at Teterboro. Excellent aircraft for conversion. The best we have ever purchased. Complete and detailed specifications upon request.

Owned and Offered By

ATLANTIC AVIATION CORPORATION
Hasbrouck Heights 8-1740, Teterboro, N. J.

We can furnish high frequency motor generators for special applications. Send us your requirements.

WINCHARGER PU-7/AP: Input: 28 VDC, 160 Amps. Output: 115 VAC. Single ph. 2500 V.A. 400 C.P.S. Frequency and voltage regulation built in. Price $47.00

GENERAL ELECTRIC 400 CYCLE UNITS. Operate at 26 VDC 100 Amp. Output: 115 VAC 1 ϕ. 400 CPS. 1500 V.A. With filter system built-in. Price $29.50

BENDIX-ECLIPSE 800 CYCLE AERO UNIT. Input: 21-28 VDC, 75 amps. Output: 115 V. 10.5 Amp. 800 C.P.S. Complete filter system mounted thereon. Price $22.50

WINCHARGER PU-16/AP INVERTER. Type MG750. Input: 28 volts, 60 amp. Output: 115 volts, 6.5 amp., 400 cyc., 1 ph. Brand new. Price $69.50

LELAND INVERTER TYPE MG 4A. DC Input: 27.5 volts, 38 amp., 6000 RPM. Output: 115 volts, 1 ph., 400 cyc., 500 VA. Like new and fully guaranteed. Price $39.50

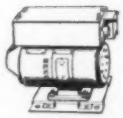
GENERAL ELECTRIC MODEL 5D21NJ3A. Input: 27 volts, 35 amp. Output: 115 volts, 485 VA, 1 ph., 400 cyc. Price $31.50

If it's from one frequency to another; from DC to AC or AC to DC, if it's from one voltage to another, then call on us.

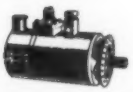
WILLIAM I. HORLICK COMPANY

Established in 1922
409 Atlantic Ave.
Tel HAncock 6-2480
Boston 10, Massachusetts

FOR SALE!!



PE 206A Inverters



Bendix NEA-5 Generators
Original Overseas Packs

LEJAY MANUFACTURING CO.
2911 S. Emerson Ave., Minneapolis 8, Minn.
(See our ad, page 52)

Jonco AIRCRAFT CORP.

Now Soliciting

AIR-FRAME ASSEMBLY or JIG AND FIXTURE SUB CONTRACTS

250 YEARS SUPERVISORY
AIRCRAFT KNOW HOW
AT YOUR DISPOSAL

Jonco AIRCRAFT CORP.

Box 3020 Shawnee, Okla.

STOWARD CO.

Exporters

SPECIALISTS IN FILLING OVERSEAS REQUIREMENTS

- A N Hardware
- Aircraft Parts
- Electronic Parts
- Electronic Equipment

132 Front St., New York 5, N.Y.
Cable Address:—Sumradcomp

AIRCRAFT MACHINES

SPOT DELIVERY

(1) **Farnham Bending Rolls**
Model #638, Age 1942
Cap. 6' x ⅝" radius x 1/32" aluminum
Like New

(3) **Farnham Rail Drills**
Carriage, radial jointed arm swing 32", Age 1942
Hi Cycle, 3 phase 180/220 V.
Capacity ¾" Hi Speed

WIRE - PHONE - WRITE

KINGS COUNTY MACHINERY EXCHANGE
408 Atlantic Avenue, Brooklyn 17, N. Y.
Dept. "A"

2—DOUGLAS C-47A CARGO 24 Volt—92 ENGINES
1—EXECUTIVE INTERIOR LODESTAR
Zero time throughout since overhaul and modification.

for details:

STONNELL & HOLLADAY
National Airport Washington, D. C.
Phone STerling 5753

Executive Type **TWIN ENGINE BEECHCRAFT** Model D-18-s, with Hydromatic. A-1 condition. Total airframe hours 2950. Hours since major engine Overhaul—430 & 610. Zero time spare engine included. Low frequency transmitter and receiver; ARC T11-VHF transmitter and receiver. Relicensed September 1951. Price $42,875.

H. C. PRICE CO.
Box 1111, Bartlesville, Oklahoma

LOCKHEED 12A

A fine executive airplane, beautifully finished and completely overhauled. Equipped with reclining chairs, lounge and latest VHF and Omni. Immediate delivery. Must Sacrifice. $25,000.00.

AERO WAYS, INC.
Cleveland Airport Cleveland, Ohio

NEW
Guaranteed Rebuilt
MOTORS-GENERATORS-CONTROLS
NOW IN STOCK
We buy surplus equipment

L.J. LAND Inc.

Box 756 Reading-6Pa.

HANGAR FOR SALE

One New 194'x200' Airplane Hanger. Large enough and designed for a B-29. Doors at each end. Has never been erected.

FIRESTONE TIRE & RUBBER CO.
Attn: W. K. Adkins, Phone - HEmlock 1671
Akron (17), Ohio

IMPORTANT! ***Many items in this group have not been listed in previous ads!***

One of America's largest stocks of UNUSED

AIRCRAFT PARTS

We own and offer all parts listed—plus many thousands more—stocked in our Baltimore warehouse!

ELECTRONIC COMPONENTS

Quantity	Part No.	Description
7	RTA 1B	Transceiver
35	RA10 DB	Receiver
20	TA 12B	Transmitter
150	DA-1F	Dynamotor

PRATT AND WHITNEY AIRCRAFT ENGINE PARTS

Quantity	Part No.	Description
166	1045A	Bearing
500	3506	Flange
130	8289	Follower Ass'y
814	35814	Blower Ass'y
22	36759	Rod Ass'y
182	46400E	Liner
30	48346	Cylinder
53	48362	Shaft
175	49363	Shaft
56	48199	Sump
290	48461	Gear
78	76216	Gear
1178	84989	Bearing
113	84487	Housing
77	84591C	Nose Housing
200	48350-D	Crankcase Ass'y
200	84083	Cylinder
100	84084	Cylinder
200	84085	Cylinder

HUGE STOCKS OF ALL TYPES *AN* HARDWARE NEW—UNUSED. WRITE FOR DETAILED LISTINGS.

LEAR ACTUATORS AND SCREW JACKS

Quantity	Part No.
42	400 AJ3
161	420 FC
160	490 DY
26	550 CD
14	550 CG
195	550 AJ
195	550 CP
104	550 EC

ACCUMULATORS

Quantity	Part No.	Mfg.
280	AN2213-1	Vickers
53	AN6203-3	Bendix-10"-1500 P.S.I.

LIGHT ASSEMBLIES

Quantity	Part No.	Mfg.
2000	AN3096-4	Grimes (Amber)
808	AN3096-5	Grimes (Red)
380	AN3096-6	Grimes (Green)

VALVES

Quantity	Part No.	Mfg.
478	D9530	Adel
933	D9530	Adel
428	D9560-9	Adel
744	D10044	Adel
2200	AN4078-1	United Aircraft (Oil Dilution)
88	579-3A	Eclipse
244	D10051	Adel

BLOWERS

Quantity	Part No.	Mfg.
25	U709-15	Joy
16	1951-6	Dynamic Air Eng.
43	458 AA-6C	Dynamic Air Eng.
24	8861G-6C	Dynamic Air Eng.

AIRCRAFT ACCESSORIES

OIL COOLER ASSEMBLIES

Quantity	Part No.	Mfg.	Description
45	AN4103-2	Clifford	Brass (Valve # U4785)
38	18597-2	Airesearch	Aluminum (Width 8") (Length 9")

PUMPS

160	2E492E	Pesco	Fuel
700	TFD 8600	Thompson	Fuel Booster
125	D7818	Adel	Anti-Ice
170	2P771-A	Pesco	Fuel Booster
250	AN4014	Eric Meter	Wobble (D-3)
300	1H260-K & KA	Pesco	Hydraulic

INSTRUMENTS

22	AN5531-1	G. E.	Tach. Generator
1000	AN5780-2	G. E.	Wheel & Flap Position Indicator
400	AN5780-2	Weston	Same as above
1000	AW2-65B	U. S. Gauge	Air Pressure Gauge
16	76B19	Lewis Eng.	Cyl. Head Temp.
10	4689	Lewis Eng.	Air Temp. Ind.
31	47B21	Lewis Eng.	Temperature Ind.
12	47B22	Lewis Eng.	Temperature Ind.
20	47B23	Lewis Eng.	Temperature Ind.
36	47B24	Lewis Eng.	Temperature Ind.
10	76Z2	Lewis Eng.	Air Temp. Ind.
11	7684	Lewis Eng.	Temperature Ind.
20	77C4	Lewis Eng.	Temperature Ind.
21	77C5	Lewis Eng.	Temperature Ind.
85	727TY72Z2	Weston	Left Wing Anti-Icing
88	727TY73Z2	Weston	Right Wing Anti-Icing
83	727TY747Z	Weston	Tail Anti Ice
11	2227-1*D 3A	Eclipse	Dual Tachometer
22	8DJ-29-AAY	G. E.	Indicator (Cowl Flap)
45	2548K-6-032	Kollsman	Differential Pressure Ga.
25	906-6-011	Kollsman	Dual Altimeter and Differential Pressure Ga.
8	14601-1G-B1	Eclipse	Attitude Gyro
22	15100-1B	Eclipse	Pitch Trim Ind.
10	20000-8A-14	Eclipse	Magnesyn Position Ind.
23	20100-11C-4-A1	Eclipse	Magnesyn Wing Flap Ind.
40	23000-2A	Eclipse	Position Transmitter
25	46N2	Jaeger	24 Hour Clock

MISCELLANEOUS COMPONENTS

115	P4CA2A	Parker	Primer
80	AN3213-1	Scintilla	Ignition Switch
568	A-9 (94-22226)	Nasco	Ignition Switch
687	RS-9	Mallory	Selector Box
90	JH950-R	Jack & Heintz	Starter Motor
492	S 841 (94-32253)	Electronic Labs	Box
8	FA122	Wallace & Tiernan	Flasher
1000	13018-A	Bendix	Interphone Box
140	K14949E	Marquette	Windshield Wiper Kit
73	3123 3A	Eclipse	Warning Unit
188	EYLC-2334	Barber Colman	Control
11	12086-1C	Eclipse	Amplifier
174	450 0	Skinner	Gasoline Filter
250	558-1A	Eclipse	Oil Separator
100	564-2A	Eclipse	Oil Separator
100	71A 3A	Eclipse	Generator (NEA-1A)
5	656536-421	Sperry	Controller Pedestal (A-12)
37	117-47	Edison	Detector
89	319	Edwards	Horn
280	921 B	Stewart-Warner	Heater (200000 BTU)
340	981280	Kidde	Co2 Cylinder
85	19994-2	Ade'	Lock Valve
90	993748	Kidde	Oxygen Cylinder
80	DW98	Eclipse	Transformer
97	6041H-146A	Cutler Hammer	Relay (B-12)
22	0655 D	Aro	Oxygen Regulator
22	M-2031	Air Associates	Actuator
148	PG908AS1	Minn. Honeywell	Air Ram Switch
33	DW47	Eclipse	Transformer
11	DW33	Eclipse	Transformer
65	ASDC2	CO2 Mfg. Co.	Fire Detector
750	ND21	American Gas Accumulator Co.	Time Delay Relay
30	UA-3150	United Air Prod.	Oil Temp. Reg. 5"
29	UA-3160	United Air Prod.	Oil Temp. Reg. 6"
95	UA 3160C	United Air Prod.	Oil Temp. Reg. 6"
73	UA 6007-CF-DV5	United Air Prod.	Oil Temp. Reg. 7"
14	VA 6009-S 30	United Air Prod.	Oil Temp. Reg. 9"
11	UA-6012K S30K	United Air Prod.	Oil Temp. Reg. 12"

★ ***Send us your material lists for screening!*** **WRITE—WIRE—PHONE**

COMMERCIAL SURPLUS SALES CO.

4101 CURTIS AVENUE, BALTIMORE 26, MARYLAND **TELEPHONE: CURTIS 3300**

COCKPIT VIEWPOINT

By Capt. R. C. Robson

Liaison Pilot Sounds Off on Air Support

Military air power has provided many lively debates for the past few years. Latest is the question of air support for ground operations, specifically close-up, front-line action. The Korean war has elevated this topic so that it now engulfs all branches of service—Marine Corps, Navy, Army and Air Force—and is considered a problem of JCS magnitude.

As is so often the case with military affairs the problem is discussed, publicly, only on a high level. Congressional and general staff views are heard but the voice of lower rank, from the field, are silent.

With no intent to embarrass military procotol this author discussed the case of air/ground operations with a pilot well-qualified on the subject. Recently back from Korea, this captain flew more than 600 combat hours in 8 months as an Army liaison pilot. Flying at low altitude he directed Navy, Marine and Air Force planes to the targets and observed the results first hand.

This is his story.

► **Great Equalizer**—Ground-supporting aviation is one of the major factors for UN successes in Korea. It is the "equalizer" against overwhelming numbers of Communist soldiers. Artillery fire, while good, does not always force the enemy to take cover. Airplanes do. Red troops are terrorized by our planes and worry over detection hampers them.

Army observers with air training proved to be better spotters than pilots unfamiliar with ground warfare. The assignment of Air Force personnel to ride "second man" with Army liaison pilots had little value. By the time the new men learned their job they would be rotated out of the area. Some Army pilots insisted on flying alone rather than risk another person's life needlessly.

Crowded communications frequencies and delays in issuing orders greatly hampered air support operations. Many targets went unmolested because of the inability of liaison pilots to get supporting aircraft quickly. The severe shortage of liaison planes and pilots made it impossible to cover enemy territory adequately.

► **Props Best**—The propeller-driven (carrier-based) attack planes of the Marine Corps and Navy provided the best support by far. They could remain in an area until the job was done whereas many times a jet could spare time for only one pass at a target. The steep-angle, "dive bomb" technique of the attack planes concentrated maximum ammunition in a small area while jets, with their shallow dive and high speed, sprayed a large area.

Most important superiority of the attack planes lay in the ammunition they carried. Standard reply when questioned by a liaison pilot as to what they were carrying was, "You name it, we got it." Jets carried only rockets and machine guns; attack planes had, in addition, bombs and napalm.

► **Liaison Plane Specs**—The experiences of Korea indicated that a liaison plane must be of high-wing design, engine mounted as low as possible, with lots of glass to provide good visibility forward and down. The Korean terrain favored a high rate of climb for short field takeoffs, getting out of steep-walled valleys and for out-climbing small arms fire. A low stalling speed, adequate cockpit heater and reliable radio equipment were also placed in high priority.

Since air/ground support deals largely with targets that are essentially "army" in nature, the captain felt that Army control of the entire operation would be most desirable. For effective work the liaison and the support planes must be designed specifically for their job and be provided in adequate numbers.

WHAT'S NEW

New Books

Handbook of Supersonic Aerodynamics, edited by the Johns Hopkins University, Applied Physics Laboratory. Available from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Some years back, a collection of informal memos and notes was coordinated by some of the personnel at Johns Hopkins' APL into two volumes. These volumes were published and distributed by APL in an effort to place into as many hands as possible a collection of information about supersonic aerodynamics. Included between the covers were suggestions on standardization of nomenclature, graphs, charts and formulae for particular and general applications.

And as is natural with any such collection, it grew with the art. Sections of it were classified and given limited distribution; but the editors wanted as much of the handbook as possible to get the widest circulation which was permissible.

Now, the Navy's Bureau of Ordnance has effected a plan whereby the handbook is being made available to the general public through the Superintendent of Documents, Washington. All the unclassified volumes in the series are to be issued as BuOrd publications (NavOrd Reports 1488).

Currently, only two volumes are available. Volume 1, which contains four sections—Symbols and Nomenclature, Fundamental Equations and Formulae, General Atmospheric Data, and Mechanics and Thermodynamics of Steady One-Dimensional Gas Flow—sells for $1.75. Volume 2, which comprises only one section on compressible flow tables and graphs, costs $1.50.

Volumes 3 through 6 are scheduled for publication during 1952. Prices have not yet been determined for these later volumes.—DAA

New Literature

Ball and Roller Ball Engineering is a 270-page book covering in technical detail bearing types and nomenclature, capacities, selection, design, installation, maintenance, failure causes, and load calculations. First published in 1945, it is now being made generally available for the first time by SKF Industries, Inc., Philadelphia 32, Pa. Price is quoted as $1.75.

Available from the same source is the booklet, **Air Fairs,** which covers the staging of a safe, constructive and interesting air show. It sells for 20 cents.

ADVERTISERS IN THIS ISSUE

AVIATION WEEK—OCTOBER 1, 1951

AEROTEC CORPORATION, THE 50
Agency—Hening & Co., Inc.

ALUMINUM CO. OF AMERICA 36
Agency—Fuller & Smith & Ross, Inc.

BENDIX RADIO DIV. OF BENDIX AVIATION CORP. 35
Agency—MacManus, John & Adams, Inc.

B. G. CORPORATION, THE ..... Front Cover
Agency—Buchanan & Co., Inc.

BREEZE CORPORATIONS, INC. 27
Agency—Burke Dowling Adams, Inc.

CHAMPION SPARK PLUG CO. 42
Agency—MacManus, John & Adams, Inc.

CLIFFORD MANUFACTURING COMPANY 38
Agency—James Thomas Chirurg Co.

CONMAR PRODUCTS CORP. 3
Agency—Wm. H. Weintraub & Co., Inc.

CONSOLIDATED INDUSTRIES 47
Agency—Lindsay Advertising

CONTROL PRODUCTS, INC. 47
Agency—George Homer Martin Associates

ELASTIC STOP NUT CORP. OF AMERICA ..... Fourth Cover
Agency—G. M. Basford Co.

ESSO STANDARD OIL CO. 34
Agency—McCann-Erickson Corp.

FORD INSTRUMENT COMPANY 49
Agency—The Caples Company

GENERAL ELECTRIC COMPANY 6
Agency—G. M. Basford Co.

GUARDIAN ELECTRIC MFG. CO. 28
Agency—Kennedy & Company

HANSEN MFG. CO., THE 49
Agency—Richard T. Brandt, Inc.

HARTMAN ELECTRICAL MFG. CO. 25
Agency—Palm & Patterson, Inc.

HOLLEY CARBURETOR CO. ..... Second Cover
Agency—Holden-Clifford-Flint, Inc.

INDIANA GEAR WORKS 7
Agency—A. L. Perkins & Co.

KOTULA COMPANY, THE 57

LEAR, INCORPORATED 32
Agency—Abbott, Kimball Co. of Calif.

LORD MANUFACTURING COMPANY 57
Agency—W. S. Hill Company

MECHANEERS, INCORPORATED 57

MONOGRAM MANUFACTURING CO. 8
Agency—Taggart & Young, Adv.

NORTH AMERICAN AVIATION, INC. 51
Agency—Batten, Barton, Durstine & Osborn, Inc.

NORTHROP AIRCRAFT, INC. 40, 41
Agency—West-Marquis, Inc.

NYLCO PRODUCTS, INC. 47
Agency—Howard Wesson Co.

PHILLIPS PETROLEUM CO. 5
Agency—Lambert & Feasley, Inc.

PIASECKI HELICOPTER CORP. 46
Agency—B. K. Davis & Bro.

REMINGTON RAND, INCORPORATED 10
Agency—Leeford Adv. Agency, Inc.

SCINTILLA MAGNETO DIV. OF BENDIX AVIATION CORP. 26
Agency—MacManus, John & Adams, Inc.

SEARCHLIGHT SECTION 51, 52, 53, 54, 55

SINCLAIR REFINING CO. 30, 31
Agency—Morey, Humm & Johnstone, Inc.

SKINNER PURIFIER DIV. OF BENDIX AVIATION CORP. 48
Agency—MacManus, John & Adams, Inc.

SOUTHWEST AIRMOTIVE CO. 39
Agency—Laughlin-Wilson-Baxter & Persons, Adv.

SPERRY GYROSCOPE COMPANY ..... Third Cover
Agency—Charles Dallas Reach Co., Inc.

STANDARD-THOMSON CORP. 37
Agency—Caldwell, Larkin & Co., Inc.

SWEDLOW PLASTICS CO. 23
Agency—Francis D. Gonda Adv.

TITEFLEX, INCORPORATED 4
Agency—Robert L. Marloff, Inc.

VOI-SHAN MANUFACTURING CO., INC. 29
Agency—Sudler Company Adv.

SEARCHLIGHT SECTION
(Classified Advertising)

EMPLOYMENT
Positions Vacant 51, 52, 53
Positions Wanted 52
SELLING OPPORTUNITIES WANTED 52

SPECIAL SERVICES
Contract Work 54

PLANES—EQUIPMENT
(Used or Surplus New)
For Sale 54, 55

WANTED
Equipment 52

TOOLING UP ? ? ?

We take full responsibility for tooling fabrication charges resultant from design errors. Quotation or hourly basis. No divided responsibility.

PLANNING
Operation Sheets
Tolerance Charts
Machine Parts
Plant Layout
Sheet Metal & Structures

DESIGN
Tools, Dies, Fixtures
Aircraft Assembly Jigs
Lofting EMD's
Special Devices and Machines

DESIGN AND BUILD
Tools, Dies, Fixtures
Aircraft Assembly Jigs
Templates
Form Blocks
Forming Tools
Aircraft Sub-assemblies

ENGINEERING
Production Design
Structures Design
Stress Analysis
Hydraulics
Electronics
Checking

Send for our list of current and recent projects—No obligation.

Operating Nationally

MECHANEERS INCORPORATED

Main Office
Bridgeport, Connecticut

Specialists in serving airplane, helicopter, aircraft engine, and aircraft accessory manufacturers

aviation
MANUFACTURERS

If your product gets only occasional publicity in national media, you are probably getting only half the value from your advertising dollar. The Kotula Company, pioneer agency in the development of the integrated Advertising-Public Relations "package" invites inquiry of its formula for stepping up sales for you.

The Kotula Company
400 Madison Ave., N. Y. 17, N. Y.
PLaza 3-4466 *aviation advertising*

Sets NEW PERFORMANCE Standards

LORD
RC-27A
DYNAFOCAL
for
Wright C9HE
Engines

● The new LORD RC-27A Dynafocal is setting higher standards for isolation of engine vibration. Design improvements give increased smoothness . . . greater economy . . . longer life —at all engine speeds.

Performance compromises necessarily inherent in many previous designs have been eliminated.

Superior efficiency reduces dynamic stresses throughout airframe structure . . . improves passenger comfort . . . reduces operating personnel fatigue . . . lowers maintenance costs.

LORD MANUFACTURING COMPANY
ERIE, PENNSYLVANIA

LORD BONDED RUBBER

Vibration-Control Mountings . . . Bonded-Rubber Parts

EDITORIAL

Taming the Giant's Roar

Heresy it may be, but we say airplanes are noisier than they need to be.

And that if we ignore the noise problem much longer aviation will be in very hot water.

And we think that of all people who should be most worried, it's the airlines.

The public's tolerance point is probably higher for warplanes than for commercial ships. It feels that at least military aircraft are meant for our own defense, they are necessary nuisances, they can't have refinements and niceties, and they are not pulling in big profits from our discomfort.

Most lightplanes are small and make comparatively little noise. The average executive aircraft may be larger and noisier than the grasshoppers but their fleets are not large and their noise is not incessant. The big blast will be directed at the airlines, we believe.

Someone in the air transport industry ought to be worried, at least, about the matter, and worried to the extent of starting some kind of action.

But inquiries we lodged last week with the Air Transport Assn. drew a blank on any report of major concern within the industry, or any report that anyone is doing the slightest thing about it, or intends to. Outside the ATA, one small contract cargo carrier, Meteor Air Transport, of Teterboro, N. J., is experimenting with a muffler on a DC-3. Hats off to them, and to the muffler's maker, Aero Sonic Corp. of Brooklyn. Our readers were told about this development Sept. 17.

The airlines are living in a fool's paradise in this noise matter. It will be difficult to alibi much longer that their major objective is to keep the wolf from the door in order to keep alive at all.

The air transport industry not only is making money now. It is maturing, and maturity brings new public obligations it will have to tackle sooner or later. If it tackles this noise business soon it can grasp the initiative and keep it. If it fails to take the initiative the battle will be rough, and unnecessarily so.

Nor is the problem going to be eased any by the inevitable jet transports—except for the lucky passengers.

We are not concerned at this point about the noise the customers get. They know they are going to get it; they buy their tickets with their ears wide open; and they get something in return for it—fast transportation. The poor devil on the ground—John Q. Public—feels he gets it for no good reason, 24 hours a day, and it follows him wherever he goes. Every new contract for airliners he reads about in the papers will come to mean just that much more bedlam he can look forward to.

For not much longer will he accept the shrug-of-the-shoulder plaint that all this ever-increasing din in the sky is a necessary penalty of progress. Not with all the technical wonders we seem capable of performing these days. Nor with all the profits the airlines are making. He will demand that somebody "do something."

And when John Public really gets started on this one, the indignation will be something this industry never saw before. Millions of citizens are involved; not a few thousand customers who can take airplanes or leave them alone.

Only a few hot-tempered localities containing the right explosive combination of strong-minded civic officials or state legislators are all we need to set off a chain reaction from coast to coast. It will hit the airlines right where they have never been hit seriously before by noise complaints—the money bags. The squawks from the vicinity of LaGuardia and Newark had better be interpreted for what they are—danger signals heralding a rebellion.

At least, let's be able to tell the public we are trying to think up some answers. Then do it. We can't any longer yell that "Noise is progress," and hide our heads in the sand until it all "blows over." We have got to do something more than answering isolated fire alarms such as LaGuardia and Newark with hastily conscripted volunteers from our public relations and legal departments.

Let's get down to figuring what we can really do to make airplanes quieter, as they're already built, and as they will be built next month and next year.

A New Look at Nonskeds

The Civil Aeronautics Board has made an intelligent decision in its move to conduct another comprehensive investigation of the nonscheduled air services of the sixty-odd large irregular carriers.

Few subjects in aviation have been discussed so inadequately, with so much heat, by so many experts, agencies, committees, and even the public, who cannot seem to understand what all the fuss is about.

The last good look CAB had at so-called nonscheduled air services was in 1946, when the term nonscheduled aviation had very different meanings and very different business and public implications from those of today.

We shall watch the new investigation closely. If it is based on facts and an honest effort to ascertain the facts, let the chips fall where they may. So long as the result be safer, cheaper air transportation for the most people.

Shoptalk

AVIATION WEEK has named Byron C. Dempsey as its new correspondent in Dayton to cover the vitally important Air Materiel Command. After newspaper training on the Hammond, Ind., Times, Mr. Dempsey went into the Air Force and was assigned to the press section of the public relations office of the old Air Service Command, holding various assignments until 1945, when he left the service. He worked briefly for the Dayton Journal before returning to Wright-Patterson AFB as a civilian employe. He became associate editor of the Wright Flyer, employe and service newspaper at the fields. About three years ago he went to Procurement & Industrial Planning, becoming its public information officer until he resigned last Aug. 3.

—Robert H. Wood